Chapter 9

GENUS *DUNDOCORIS* HOBERLANDT.

9.1 *Dundocoris*

Dundocoris was the first apterous carventine genus described from Africa. It was based on a single female from Dundo in Angola described as *Dundocoris vilhenai* by Hoberlandt (1952). Subsequently Hoberlandt also described *Dundocoris basilewskyi* from Ruanda (1956), *Dundocoris callani* and *Dundocoris latebrosus* from South Africa (1959) and *Dundocoris angolensis* also from Angola (1967). Kormilev (1961) described two more species from Natal (South Africa), namely *Dundocoris natalensis* and *Dundocoris stuckenbergi*. Heiss and Jacobs (1989) removed *latebrosus* from *Dundocoris* and erected the genus *Pondocoris* to accommodate it and they also described *Dundocoris nigromaculatus* from South Africa.

Hoberlandt mainly diagnosed the genus on account of

a) relative lengths of the antennae (all subequal)
b) position of the spiracles
c) fused trochanters

None of these characters proved to be reliable and much variation exist in the described species and also in the many undescribed species at hand. A redescription of the genus is thus appropriate.

Redescription:

Apterous. Body oval, incrustate, shining and granular beneath incrustation, in some species body colour in conjunction with incrustation form definite patterns. The following description is based on specimens with the incrustation removed.

Head: Wider across eyes than length (excluding neck area). Genae produced beyond apex of clypeus. Antenniferous lobes prominent, diverging anteriorly. Ocelli absent. Postocular tubercles variously developed, from indistinct to prominent, acute, extending beyond level of outer margins of eyes. Jugae small, triangular. Vertex with three irregularly nodose median ridges; the lateral two ending on jugae or curving laterad to follow the outline of the usually prominent oval interocular callosities; the median ridge extending nearly to the tip of the clypeus where it usually ends in a subapical tubercle. Antennae 4-segmented, longer than width of head, first segment always the thickest, slightly curved, tapering towards base and usually also towards apex, always extending beyond apex of genae; second segment always shorter and much thinner than segment one, slightly curved basally, gradually thickened towards apex; third segment slender, usually the longest and thinnest segment; pedicellate, slightly and evenly thickened towards apex; fourth segment fusiform, thicker than segments 2 and 3, conical apex pilose. Labium shorter than head, 3-segmented, only apical two segments visible exteriorly, leaving the head through a split-like or elongate oval atrium. Labrum not discernable. Rostral groove well developed, closed posteriorly. Neck slightly constricted behind the head.

Thorax: Dorsum. Pronotum more than 2,5x as wide as long. Collar prominent with 2(1+1) large tubercles laterally and 2(1+1) smaller tubercles dorsolaterally. Pronotum constricted behind the collar. Lateral lobes granulate and usually slightly reflexed so that lobulate propleural margin is visible from above. Disk formed by 2(1+1) shining plates with uneven surface, medially separated by a longitudinal furrow, separated from collar by a depression and a transverse carina which is often also depressed or cleaved medially. Pronotum separated from mesonotum by a prominent transverse sulcus, posterior margin usually cut out medially for the reception of the mesonotal median ridge.

Mesonotum shorter and wider than pronotum, comprising 2(1+1) nearly rectangular plates separated by a median ridge. This ridge usually consist of 2(1+1) longitudinal elevations separated by a longitudinal median depression. In several species however, the two ridges fuse posteriorly to form a bar which may intersect the metanotum.

Metanotum medially shorter but laterally much longer than mesonotum, well delimited laterally from mesonotum by a sulcus which ends in a deep pit adjacent to the median ridge. Median ridge formed by 2(1+1) subrectangular or -triangular elevations which is separated medially by a longitudinal depression and often by the median, posteriorly extended part of the mesonotal ridge. Metanotal median ridge always separated from mesonotal median ridge by a transverse or posteromedially directed furrow. Lateral lobes granular, often not well delimited from disk. Disk with 2(1+1) glabrous comma-shaped elevations anteriorly and a transverse row of nodules on its posterior margin.

MTg 1 usually forming 2(1+1) transverse elevated parts of more or less constant width which are separated medially by a depression. MTg 1 and metanotum variously fused, from totally fused to separated along its total anterior margin by a thin suture (the latter in a few species where MTg I is very much elevated), it is usually fused medially but separated laterally by a suture.

MTg 2 slightly longer than MTg 1, separated from the latter by a thin transverse suture and being depressed relative to MTg 1. Surface of MTg 2 usually relatively smooth except for 2(1+1) longitudinal I- or L-shaped elevations adjacent to median groove and 2(1+1) sublateral ridges directly anterior to sublateral carinae on tergal disk.

Venter. Prosternum usually with an inverted T-shaped elevation. Collar variously developed ventrally of lateral tubercles. Meso- and metasterna smooth, each with a median finely rastrate, slightly depressed oval area.

Legs: Slender, covered with setiferous tubercles. Throchanters fused with femora, not discernable. Femora and tibiae unmodified. Protibial comb present. Tarsi 2-segmented, distal segment longest bearing two claws, each with associated curved pulvillus. Two bristle-like parempodia present.

Abdomen: Dorsum. MTg 3-6 fused to form tergal disk which is variously elevated along median line, usually highest on MTg 4. Carinae separating glabrous impressions Y-shaped, variously developed: from well defined to fragmented in series of nodules to almost indiscernible. Sublateral glabrous impressions separated by the Y-shaped carinae that do not reach lateral margin. DELTg 1-3 fused but margin between DELTg 2 and 3 may be indicated by sculpture. DELTg 2-7 of females with a longitudinal sulcus that delimit a dorsal hem that is much less tuberculate than rest of the DELTg.

Dorsal hem darkly coloured on anterior half of each DELTg and light yellowish on posterior half giving it a typical checkered appearance. Posteroexterior angles of DELTg 3-7 and especially 5-7 increasingly protruding. MTg 7 of males raised medially for the reception of the pygophore; paratergites 8 of males short, conical, not reaching apex of pygophore. MTg 7 of females with a transverse ridge near posterior margin; paratergites 8 produced posteriorly as 2(1+1) semi-acute lobes that nearly reach the level of the apex of tergite 9.

Venter. Sternites 1-3 fused. Slightly depressed finely rastrate, oval areas medially present on sternites 1+2, 3-7. Intersegmental sutures 3/4, 4/5, 5/6 and 6/7 well developed, reaching lateral margins of body; 6/7 medially produced anteriad in females to accommodate genitalia. VLTg 3-6 delimited by longitudinal sulci. Ventral hem well developed in females on segments 2-4, variously developed on 5-7. Spiracle 2 ventral, 3-4 variously positioned, 5-7 lateral and visible from above, 8 subterminal on paratergites.

Genitalia: Visible part pygophore pyriform with a rugose surface, dorsally with 2(1+1) median subtriangular elevations separated by a cleft which ends about at level of paratergites 8, ventral of this a oval or elongate pit with carinate margins usually present. In dorsal view, of part usually obscured by MTg 7, 2(1+1) subquadrate "pseudophallic styli" are present just posterior of the visible dorsal parts of the parameres. Female genitalia similar to those of most Carventinae.

Discussion: *Dundocoris* is the most species rich genus of Afrotropical Carventinae. This, to my mind, is partly due to the fact that it has many plesiomorphic characters and is a "dumping ground" for species which does not show obvious apomorphic character states. The genus is very variable (e.g. species with nodulate carinae, species where the suture between the metathorax and MTg 1 is present along the total border, species where the mesonotal ridge is extended posteriorly and may reach MTg 1 or further back, variable spiracle patterns etc.) and it would not be impossible to fragment it into several genera. At this stage, however the relative importance of these characters is uncertain and much more study is necessary before the relationships between the species will be satisfactorily resolved.

Dundocoris is closely related to *Silvacoris* from which it can be distinguished by the presence of the dorsal and ventral hems, the Y-shaped carinae, which usually do not reach the lateral margins of the tergal disk, the non-granulate notal ridge and the different structure of MTg 1 and 2.

9.1.1 ***Dundocoris nodulicarinus* spec. nov.**, Figs 274-293.

Length: ♂ 3,4 - 4,4 mm; ♀ 3,7 - 5,1 mm.

Width: ♂ 1,7 - 2,2 mm; ♀ 1,9 - 2,6 mm.

Diagnostic measurements are given in Tables 9.1-9.3.

Apterous. Body coated with a light yellowish incrustation resulting in a uniform brownish appearance of heavily coated specimens. Slightly incrustate specimens have the body light brownish except for collar, lateral part of MTg 2, the triangular anterior part of DELTg 1+2+3, the anterior halves of all other DELTg's the elevation on the middle of the tergal disk, the posterior part of MTg 7 and tergum 9(♀) or the pygophore (♂) which are dark brown to black. The following description is based on specimens with the incrustation removed.

Head: About 1,05x as wide (across eyes) as long (not including neck.) Genae straight or slightly diverging anteriorly. Postocular tubercles acute, laterally directed, usually reaching to level of outer margins of eyes. Subapical tubercle on clypeus well developed. Antennae about 1,7x as long as width across eyes, first segment tapering towards base and slightly towards apex, extending beyond apex of genae by about half its length; relative lengths of segments: 14:9,6:17:10 (differing slightly between subspecies and sexes).

Thorax: Dorsum. Pronotum about 3x as wide as long. Lateral lobes not well delimited from disk, coarsely granulate, forming a small anterolateral projecting lobe anteriorly. Disk irregularly excavated. Transverse ridge behind collar with a median depression.

Mesonotal median ridge with 2(1+1) parallel ridges, split over total length by a longitudinal suture, usually slightly curving laterad posteriorly and containing as a row of tubercles on posterior margin of mesonotum. Disk smooth anteriorly, adjacent to median ridge and sublaterally adjacent to lateral lobes; irregularly excavated posteriorly in middle. Lateral lobes coarsely granulate, margins straight, converging anteriorly.

Suture separating meso- and metanotum very shallow sublaterally, deeper submedially. Metanotal disk smooth anteriorly and laterally; a transverse row of tubercles indicate its posterior margin where it is completely fused with MTg 1. Lateral lobes coarsely granulate, margins straight or slightly concave. Median ridge with 2(1+1) suboval or subquadrangular elevations separated by a median depression.

MTg 1 completely fused with metanotum and even laterally no indication of a suture is present. MTg 1 slightly and evenly raised relative to metanotum except laterally where it is on a slightly lower level. MTg 1 with 2(1+1) posterolateral diverging elevations adjacent to median depression; 2(1+1) sublateral elevations, lateral of which the surface is relatively smooth while irregular elevations is present between them and the submedian elevations.

MTg 2 subequal in length to MTg 1, separated laterally from it by a suture, medially and submedially by a nearly vertical, abrupt incline as it is on a lower level; with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, rest fairly smooth except for some irregular elevations just lateral of submedian ridges.

Venter and Legs: Collar fairly well developed ventral of lateral tubercles. Rest as for genus.

Abdomen: Dorsum. Tergal disk about 1,3x as wide as long in males and 1,13x in females; moderately elevated along median line. Carinae separating glabrous impressions nodulate, usually not reaching lateral margin of tergal disk. DELTg's of females with well developed dorsal hem and typical checkered pattern. Posteroexterior angles of DELTg 5-7 increasingly protruding.

Venter. Ventral hem in females well developed on VELTg 1-4, less well and sometimes obliterated on 5-6 and usually indistinct on 7. Spiracles 2 ventral; 3-4 sublateral, 3 more than two spiracle widths from lateral margin in females and about 1½ in males, 4 just less than 2 spiracles widths from lateral margin in females and just more than 1 in males; 5-7 lateral and visible from above, 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 288-293. Removed parameres as in Figs 280-287.

Chromosome number: $2n(♂) = 14XY, 9XY_1Y_2$ or $7XY_1Y_2$.

Habitat and distribution: Coastal and montane evergreen forests in southern Kwazulu-Natal and the Eastern Cape (Fig. 254)

Etymology: Nodulicarinus referring to the nodulate carinae on the tergal disk.

Discussion. *Dundocoris nodulicarinus* is closely related to *Dundocoris marieps* and *Dundocoris transvaalensis* with which it shares the nodulate carinae on the tergal disk, but can be distinguished from both by having no indication of a suture between the metanotum and MTg 1, by having the antennae more than 1,6x as long as width across eyes (less than 1,55x in other two species), by having spiracles 4 much further away from lateral margin, by having MTg 1 less elevated relative to metanotum, by having the longitudinal elevation on the mesonotal median ridge relatively shorter and broader and by its chromosome number. It can also be distinguished from *Dundocoris transvaalensis* by having the lateral margin of the pronotum concave and by having antennal segment 4 only slightly longer than 2 and segment 3 distinctly longer than 1. It can also be distinguished from *Dundocoris marieps* by never having the elevations of the mesonotal median ridge fused, having the tergal disk much wider than long, having antennal segment 2 and 3 relatively shorter and segment 1 not abruptly tapering towards apex.

MATERIAL EXAMINED: See under subspecies.

9.1.1.1 ***Dundocoris nodulicarinus nodulicarinus*** **spec. et subspec. nov.**, Figs 274, 278, 282, 284, 288-289.

Diagnostic measurements are given in Table 9.1.

Table 9.1. Measurements (in mm) of *Dundocoris nodulicarinus nodulicarinus* spec. nov. from Mpesheni forest.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range	AT#	N	Mean	SD	Range
Total	length	4.05	3	4.07	0.036	4.04-4.11	4.78	2	4.90	0.168	4.77-5.02
	width	1.88	3	1.91	0.054	1.87-1.98	2.29	2	2.34	0.069	2.28-2.39
Head	length	0.78	3	0.76	0.025	0.73-0.79	0.84	2	0.83	0.019	0.81-0.85
	width	0.80	3	0.81	0.006	0.80-0.82	0.85	2	0.86	0.009	0.85-0.87
Pronotum	length	0.49	3	0.47	0.026	0.44-0.49	0.50	2	0.51	0.013	0.50-0.52
	width	1.40	3	1.41	0.018	1.39-1.43	1.52	2	1.55	0.039	1.52-1.58
Tergal disk	length	0.97	3	0.97	0.051	0.92-1.03	1.45	2	1.47	0.021	1.45-1.49
	width	1.24	3	1.27	0.043	1.23-1.33	1.62	2	1.65	0.042	1.61-1.68
Antennal segments	I	0.38	3	0.37	0.011	0.35-0.39	0.40	2	0.39	0.001	0.39-0.40
	II	0.26	3	0.26	0.004	0.25-0.27	0.28	2	0.28	0.009	0.27-0.29
	III	0.43	3	0.46	0.032	0.43-0.50	0.49	2	0.49	0.006	0.48-0.50
	IV	0.26	3	0.27	0.008	0.26-0.28	0.28	2	0.29	0.009	0.28-0.30

*** HT = holotype. # AT = allotype.**

I could not find any clear-cut and constant morphological differences between the three subspecies although there seem to be (on average) some slight morphometrical differences between them. The nominate subspecies seem to be marginally more elongate than the other two in being about 2,1x (versus 2x) as long as wide and it is also larger than *D. nodulicarinus septeni*.

Chromosome number: 2n(♂) = 14XY

Habitat and distribution: So far it has only been collected in montane evergreen forests in southern Kwazulu-Natal (Fig. 254).

Discussion: I have specifically chosen the 14XY cytotype as the nominate subspecies as the other two chromosome numbers are without doubt derived and the 14XY one probably represents the original chromosome number of the species.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Mpesheni forest, nr. Kokstad, 30°38'S 29°40'E, 30.xi.1981, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 10 paratypes as follows: 5♂♂ 5♀♀: same data as holotype (DHJS, TMSA). I have also collected a single male at Lesser Stinkwood forest (30°33'S 29°43'E) that I used for cytogenetic studies.

9.1.1.2 *Dundocoris nodulicarinus novenus* spec. et subspec. nov., Figs. 276-277, 279, 281, 283, 287, 290-291.

Diagnostic measurements are given in Table 9.2.

Table 9.2. Measurements (in mm) of *Dundocoris nodulicarinus novenus* subspec. nov. from Isidenge forest.

STRUCTURE		MALES					FEMALES				
		HT[*]	N	Mean	SD	Range[$]	AT[#]	N	Mean	SD	Range[$]
Total	length	4.09	10	3.94	0.165	3.69-4.32	4.78	10	4.61	0.193	4.24-4.93
	width	1.94	10	1.91	0.092	1.74-2.15	2.48	10	2.38	0.105	2.19-2.57
Head	length	0.78	10	0.76	0.038	0.69-0.84	0.86	10	0.82	0.043	0.76-0.89
	width	0.80	10	0.80	0.029	0.73-0.85	0.88	10	0.85	0.032	0.81-0.93
Pronotum	length	0.47	10	0.45	0.027	0.39-0.52	0.51	10	0.48	0.032	0.43-0.53
	width	1.35	10	1.35	0.066	1.23-1.49	1.56	10	1.50	0.066	1.37-1.61
Tergal disk	length	1.01	10	1.00	0.054	0.89-1.11	1.45	10	1.42	0.061	1.28-1.55
	width	1.32	10	1.29	0.068	1.15-1.44	1.59	10	1.58	0.044	1.45-1.65
Antennal segments	I	0.37	10	0.37	0.011	0.34-0.39	0.42	10	0.40	0.016	0.37-0.43
	II	0.27	10	0.26	0.014	0.23-0.29	0.28	10	0.28	0.013	0.25-0.30
	III	0.48	10	0.46	0.027	0.41-0.53	0.53	10	0.50	0.034	0.43-0.56
	IV	0.28	10	0.27	0.011	0.24-0-29	0.30	10	0.29	0.011	0.27-0.31

[*] HT = holotype. [#] AT = allotype.

[$] May include measurements of specimens other than those used for statistical analysis.

Dundocoris nodulicarinus novenus seems to be larger and its third antennal segment relatively longer than in *D. nodulicarinus septeni*.

Chromosome number: 2n(♂) = $9XY_1Y_2$.

Habitat and distribution: It has been collected in various inland and montane forests in the Eastern Cape (Fig. 254).

Etymology: Novenus (L) = nine each, referring to the chromosome number of the subspecies.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Eastern Cape**. ♂ holotype: Isidenge forest, nr. Stutterheim, 32°40'S 27°17'E, 14-17.xii.1981, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 557 paratypes as follows: 17♂♂ 10♀♀: Qacu Forest Reserve, nr. Stutterheim, 32°25'S 27°18'E, 17.xii.1981, D.H. Jacobs (DHJS, TMSA); 1♂ 1♀ Schwarzwald forest, nr. Hogsback, 32°39'S 27°00'E, 16.xii.1981, D.H. Jacobs (DHJS); 316♂♂ 133♀♀: Same data as holotype (DHJS, TMSA); 20♂♂ 20♀♀: ditto, 26-31.i.1984 (DHJS, TMSA); 15♂♂ 15♀♀: S. Afr., Cape, Amatole, Isidenge, block A1, 32°41'S 27°16'E, 14.xi.1987, E-Y: 2511, indig. forest litter, leg. Endrödy-Younga (TMSA); 4♂♂ 2♀♀: S. Afr., Ciskei, Amatole, Pirie For., 32°43'S 27°17'E, 8.xii.1987, E-Y: 2560, indig. forest litter, leg. Endrödy-Younga (TMSA); 1♀: ditto, E-Y: 2564, beating, indig. for. (TMSA); 1♂1♀: ditto, E-Y: 2561, sift. wet for. ditch (TMSA).

9.1.1.3 *Dundocoris nodulicarinus septeni* spec. & subspec. nov., Figs 275, 285-286, 292-293.

Diagnostic measurements are given in Table 9.3.

Table 9.3. Measurements (in mm) of *Dundocoris nodulicarinus septeni* subspec. nov. from Alexandria forest.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range	AT#	N	Mean	SD	Range
Total	length	3.72	10	3.76	0.163	3.47-4.01	4.48	10	4.38	0.264	3.75-4.82
	width	1.83	10	1.89	0.079	1.70-2.00	2.23	10	2.27	0.144	1.94-2.48
Head	length	0.71	10	0.72	0.036	0.65-0.79	0.80	10	0.79	0.053	0.68-0.90
	width	0.77	10	0.76	0.031	0.71-0.83	0.82	10	0.83	0.047	0.73-0.92
Pronotum	length	0.41	10	0.43	0.029	0.38-0.49	0.47	10	0.47	0.038	0.37-0.52
	width	1.34	10	1.36	0.055	1.24-1.44	1.41	10	1.47	0.081	1.30-1.58
Tergal disk	length	0.95	10	0.98	0.031	0.91-1.02	1.32	10	1.34	0.083	1.13-1.46
	width	1.23	10	1.29	0.047	1.19-1.36	1.55	10	1.54	0.071	1.37-1.63
Antennal segments	I	0.37	10	0.36	0.022	0.33-0.39	0.39	10	0.39	0.025	0.33-0.43
	II	0.26	10	0.25	0.016	0.22-0.27	0.28	10	0.27	0.019	0.23-0.30
	III	0.45	9	0.44	0.032	0.39-0.50	0.46	10	0.46	0.040	0.39-0.52
	IV	0.28	9	0.26	0.008	0.25-0.28	0.27	10	0.28	0.013	0.25-0.30

*** HT = holotype. # AT = allotype.**

Chromosome number: 2n(♂) = $7XY_1Y_2$.

Habitat and distribution: So far it has only been collected in the Alexandria forest nr. Alexandria (Fig. 254).

Etymology: Septeni (L) = seven each, referring to the chromosome number of the subspecies.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Eastern Cape**. ♂ holotype: Alexandria forest, nr. Grahamstown, 33°43′S 26°24′E, 30.i.1984, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 40 paratypes as follows: 17♂♂ 17♀♀: Same data as holotype (DHJS, TMSA); 1♂: Alexandria forest, 33°43′S 26°22′E, 18.xii.1981, D.H. Jacobs (DHJS); 3♂♂ 2♀♀: S. Afr., SE. Cape Prov., Alexandria For. St., 33°43′S 26°23′E, 6.xii.1987, E-Y: 2555, indig. forest litter, leg. Endrödy-Younga (TMSA).

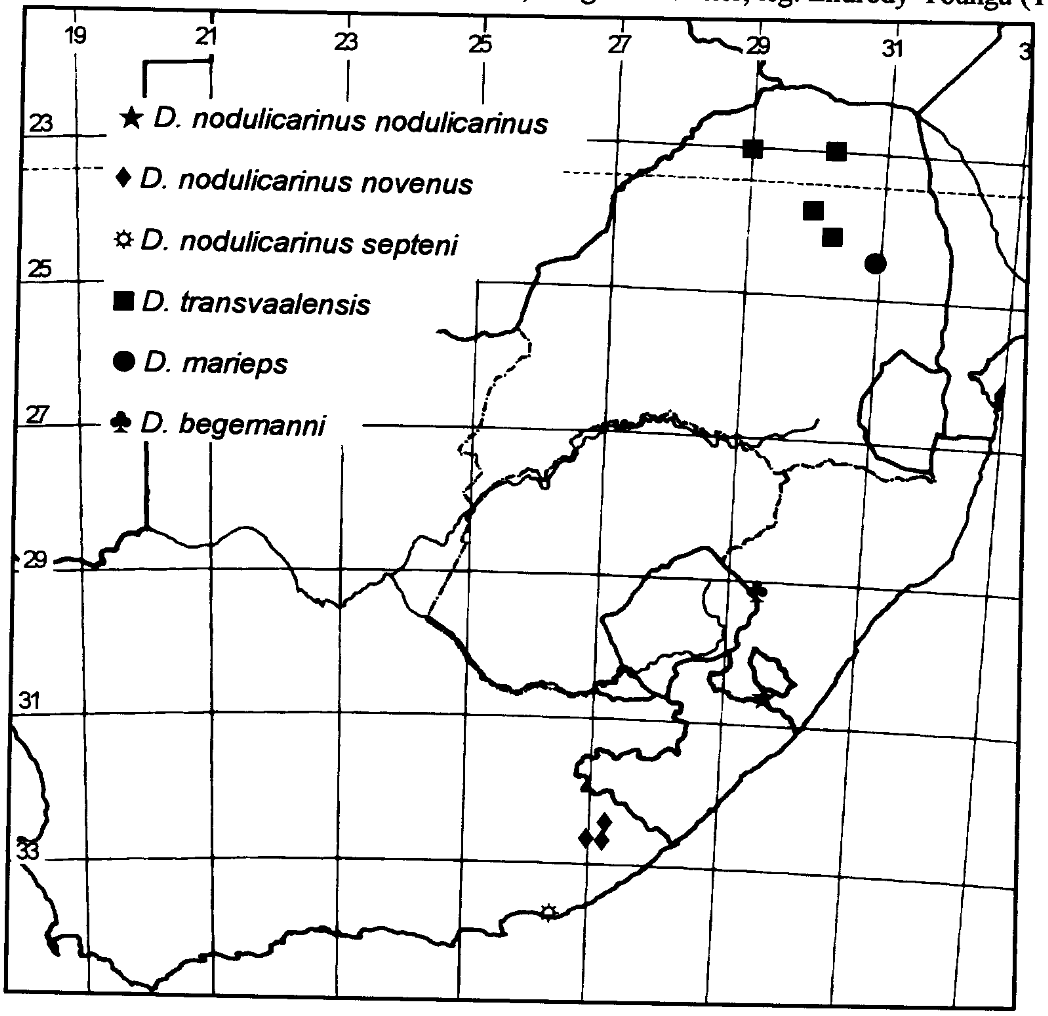


Figure 254. Distribution of *Dundocoris* species and subspecies.

9.1.2 *Dundocoris transvaalensis* spec. nov., Figs 294-301.

Length: ♂ 3,2 - 3,7 mm; ♀ 3,6 - 4,5 mm.

WIdth: ♂ 1,5 - 1,9 mm; ♀ 1,6 - 2,2 mm.

Diagnostic measurements are given in Table 9.4.

Table 9.4. Measurements (in mm) of *Dundocoris transvaalensis* spec. nov.

STRUCTURE		MALES					FEMALES				
		HT*	N♦	Mean	SD	Range$	AT#	N♦	Mean	SD	Range$
Total	length	3.34	15	3.42	0.123	3.24-3.64	3.91	10	3.98	0.123	3.60-4.45
	width	1.62	15	1.67	0.061	1.58-1.82	1.95	10	1.99	0.081	1.69-2.17
Head	length	0.66	15	0.67	0.018	0.63-0.70	0.72	10	0.71	0.022	0.66-0.76
	width	0.72	15	0.74	0.025	0.69-0.79	0.78	10	0.79	0.031	0.74-0.87
Pronotum	length	0.37	15	0.37	0.017	0.34-0.41	0.40	10	0.39	0.016	0.35-0.43
	width	1.16	15	1.18	0.045	1.12-1.26	1.30	10	1.28	0.055	1.14-1.38
Tergal disk	length	0.85	15	0.88	0.033	0.82-0.93	1.20	10	1.17	0.051	1.00-1.36
	width	1.08	15	1.13	0.047	1.04-1.23	1.34	10	1.32	0.068	1.12-1.44
Antennal segments	I	0.30	15	0.31	0.009	0.29-0.35	0.32	10	0.33	0.011	0.29-0.36
	II	0.20	15	0.20	0.010	0.18-0.23	0.21	10	0.21	0.011	0.18-0.23
	III	0.31	15	0.32	0.014	0.29-0.35	0.33	10	0.33	0.018	0.29-0.38
	IV	0.24	15	0.25	0.013	0.23-0.27	0.26	10	0.26	0.008	0.23-0.27

[*] HT = holotype. [#] AT = allotype.

[$] May include measurements of specimens other than those used for statistical analysis.

[♦] 2♂♂ 2♀♀ from Balloon forest, 1♂ 1♀ from Woodbush forest, 7♂♂ 7♀♀ from Entabeni forest and 5♂♂ from Blouberg Mountain.

Apterous. Body coated with light yellowish incrustation. In specimens not heavily incrustate the notum including MTg 1 usually light, yellowish; most of abdominal terga is somewhat darker, light to dark brown, but usually MTg 2, the anterior triangular part of DELTg 1+2+3, the scent gland protuberance on the tergal disk and in females the dorsal part of the genitalia segment and posterior part of MTg 7 is dark brownish to black, strongly contrasting with the rest of the body. The following description is based on specimens with the incrustation removed.

Head: About 1,1x as wide (across eyes) as long (not including neck). Genae usually straight. Antenniferous lobes prominent. Postocular lobes variously developed, usually acute, directed laterally, reaching to the level of the outer margins of the eyes or slightly beyond. Subapical tubercle on clypeus usually well developed. Antennae about 1,45x as long as width across eyes, first segment tapering towards base and slightly towards apex, extending beyond apex of genae by about one third of its length; relative lengths of segments: 12,5:8:12,5:10.

Thorax: Dorsum. Pronotum about 3,2x as wide as long. Lateral lobes not well delimited from disk; coarsely granulate; lateral margins straight, anteriorly converging; anterolateral angels rounded. Disk irregularly excavated. Transverse ridge behind collar with a median depression.

Median ridge of mesonotum narrow, comprising 2(1+1) longitudinal parallel ridges which are always split in males over total length by a suture, mostly in females also but fused posteriorly in few specimens; ridges usually gradually widening on posterior half. Disk smooth anteriorly, adjacent to median ridge and laterally adjacent to lateral lobes; tuberculate posteromedially, with a transverse bisinuate row of tubercles on posterior margin which may be confluent with posterolateral extreme of median ridge. Lateral lobes coarsely granulate. Meso/metanotal suture well developed.

Mesonotal disk with a smooth comma-shaped area anterolaterally, tuberculate laterally where it is indistinct from tuberculate lateral lobes, and posteromedially where a transverse row of tubercles is present on posterior margin. Median ridge with 2(1+1) suboval or subquadrangular elevations separated by a median depression in which a central longitudinal bar is often present.

MTg 1 elevated relative to metanotum, laterally separated by a suture which is usually quite well developed but indistinct in some specimens. MTg 1 with 2(1+1) transverse elevations medially, well developed on posterior margin, transforming to irregular nodules anterolaterally, lateral third fairly smooth. These elevations are medially always separated by a depression, some with a indication of a median bar.

MTg 2 subequal in length to MTg 1, on a lower level than it and separated from it by a vertical abrupt decline as well as a suture laterally, with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, rest fairly smooth except for some irregularly tubercles just lateral of submedian ridge.

Venter and legs: Collar fairly well developed ventral of lateral tubercles. Rest as for genus.

Abdomen: Dorsum. Tergal disk about 1,3x as wide as long in males and 1,13x in females; moderately elevated along median line but often with the hump on MTg 3 and 4 well developed and abruptly raised. Carinae separating glabrous impressions nodulate, usually very weakly developed or obliterated against lateral margin of tergal disk. Dorsal hem in females usually not distinguishable, sometimes vaguely recognizable, checked pattern of DELTg's present but often of low contrast. Posteroexterior angles of DELTg 5-7 increasingly protruding.

Venter. Ventral hem in females usually recognisable on VELTg 1-3, variously developed on 4-6. Spiracle 2 ventral; 3-4 sublateral, 3 about a spiracle width from lateral margin in females and about ½ - ¾ spiracle widths in males, 4 about half a spiracle width or less from lateral margin in females and ¼ or less in males, often marginally visible from above; 5-7 lateral and visible from above; 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 300-301. Removed parameres as in Figs 296-299.

Chromosome number: The chromosome number could not unambiguously determined as no metaphase cells were present on the cytogenetical preparations. From the diffuse/diplotene stage it seems that the chromosome number is either 2n(♂) = 26XY or 28XY.

Habitat and distribution: Montane evergreen forests in the Northern Province. This species occur over a wide area in the Northern Province, even in small isolated patches of forest for example Blouberg which is a relative dry evergreen forest (Fig 254).

Etymology: From Transvaal, the former name of the province of South Africa where the species occurs.

Discussion: *Dundocoris transvaalensis* is closely related to *Dundocoris marieps* and *Dundocoris nodulicarinus*. From the former it differs in being smaller, having the lateral margin of the pronotum straight and not concave and the anterolateral angle rounded, by having antennal segment one only slightly and evenly tapering towards apex and segments 1 and 3 relatively shorter, by having the elevations on the mesonotal ridge never fused posteriorly in males (and seldom in females) and by the different position of spiracles 3 and 4 in females. From the latter it differs as discussed under that species.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Northern Province**. ♂ holotype: Entabeni forest, nr. Louis Trichardt, 23°00′S 30°16′E, 7-9.v.1978, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 94 paratypes as follows: 1♂ 2♀♀: S. Afr., N. Transvaal, Soutpansberg, Entabeni, 22°28′S 30°15′E, 15.iii.1973, E-Y: 58, sifted compost, leg. Endrödy-Younga (TMSA); 37♂♂ 31♀♀: Same data as holotype (DHJS, TMSA); 7♂♂ 3♀♀: Blouberg mountain, 30 km west Vivo, 23°05′S 29°01′E, 4-5.v.1978, D.H. Jacobs (DHJS, TMSA); 1♂ 2♀♀: Debegeni falls, nr. Tzaneen, 10.ix.1979, D.H. Jacobs (DHJS); 1♂ 1♀: Woodbush forest, Transvaal, 23°50′S 30°00′E, 9.v.1978, D.H. Jacobs (DHJS); 4♂♂ 4♀♀: Balloon forest, Transvaal, 24°11′S 30°19′E, 8-9.x.1977 (DHJS, TMSA).

9.1.3 *Dundocoris marieps* spec. nov., Figs 302-309.

Length: ♂ 3,7 - 4,1 mm; ♀ 4,2 - 4,7 mm.
Width: ♂ 1,7 - 2,1 mm; ♀ 2,0 - 2,4 mm.
Diagnostic measurements are given in Table 9.5.

Table 9.5. Measurements (in mm) of *Dundocoris marieps* spec. nov. from Mariepskop forest.

STRUCTURE		MALES					FEMALES				
		HT[*]	N	Mean	SD	Range[$]	AT[#]	N	Mean	SD	Range[$]
Total	length	3.89	10	3.86	0.110	3.70-4.08	4.56	10	4.52	0.097	4.20-4.65
	width	1.81	10	1.82	0.064	1.74-2.01	2.25	10	2.21	0.069	2.04-2.36
Head	length	0.71	10	0.71	0.018	0.67-0.76	0.80	10	0.76	0.024	0.71-0.81
	width	0.82	10	0.84	0.019	0.81-0.87	0.92	10	0.89	0.033	0.81-0.95
Pronotum	length	0.43	10	0.43	0.014	0.40-0.46	0.46	10	0.45	0.018	0.42-0.50
	width	1.41	10	1.39	0.032	1.31-1.47	1.51	10	1.49	0.044	1.33-1.59
Tergal disk	length	1.04	10	1.02	0.033	0.94-1.08	1.38	10	1.39	0.040	1.29-1.46
	width	1.24	10	1.21	0.045	1.14-1.33	1.44	10	1.43	0.057	1.31-1.53
Antennal segments	I	0.38	10	0.38	0.017	0.35-0.40	0.40	10	0.40	0.007	0.38-0.42
	II	0.21	10	0.22	0.010	0.19-0.24	0.22	10	0.22	0.008	0.20-0.23
	III	0.41	10	0.41	0.019	0.38-0.44	0.43	10	0.42	0.011	0.40-0.44
	IV	0.27	10	0.28	0.013	0.25-0.28	0.29	10	0.28	0.011	0.26-0.30

[*] **HT = holotype.** [#] **AT = allotype.**
[$] **May include measurements of specimens other than those used for statistical analysis.**

Apterous. Body coated with a light yellowish brown incrustation resulting in an uniform brownish appearance of heavily coated specimens. Less heavily incrustate specimens with a pattern similar to the previous species. The following description is based on specimens with the incrustation removed.

Head: About 1,17x as wide (across eyes) as long (not including neck). Genae straight or slightly diverging anteriorly, usually only extending beyond apex of clypeus for a short distance. Antenniferous lobes prominent, lateral margins only slightly diverging. Postocular lobes small, usually not reaching to level of outer margins of eyes.

Subapical tubercle on clypeus usually well developed. Antennae about 1,5x as long as width across eyes, first segment extending beyond apex of genae by just less than half its length, tapering towards base and abruptly towards apex just distal to the curve in the segment, resulting that the inner margin is usually concave; relative lengths of segments: 14:8:15:10, differing slightly between sexes.

Thorax: Dorsum. Pronotum about 3,25x as wide as long. Lateral lobes coarsely granulate, lateral margins prominently concave, anterolateral angle acutely angularly projected, posterolateral angles acutely angular. Disk irregularly excavated. Transverse ridge behind collar with a slight median depression.

Median ridge of mesonotum strongly elevated, comprising 2(1+1) parallel ridges which are usually fused posteriorly (sometimes over the greater part of its length in males), forming a posteriad pointing wedge which usually partly separate the elevations on the metanotal median ridge and extends posteriorly to the anterior margin of MTg 1 as a very narrow longitudinal bar in the median depression. Disk and lateral lobes as in previous species.

Metanotum as in *Dundocoris transvaalensis* except that the median depression is very narrow.

MTg 1 medially and submedially fairly strongly elevated relative to metanotum, laterally separated by a suture. Further as in *D. transvaalensis* except that the two ridges usually meet anteromesally.

MTg 2 subequal in length or longer (especially in females) than MTg 1, very depressed relative to the latter and separated from it by the abrupt vertical decline and a suture laterally; with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, the latter very prominent; rest fairly smooth except for some tubercles just laterad of submedian ridges.

Venter and legs: Collar weakly developed ventral of lateral tubercles. Rest as for genus.

Abdomen: Dorsum. Tergal disk about 1,2x as wide as long in males and 1,02x in females, moderately elevated along median line except for the hump on MTg 3 and 4 which is abruptly and strongly elevated. Carinae separating glabrous impressions nodulate, although some variation exist in that the sublateral carinae and those posteriorly on segments 4, 5 and 6 are sometimes entire or have stretches where they are entire; carinae on segment 3 are always nodulate and the median carina in front of the hump is also always nodulate with some nodulations adjacent to it on both sides. Dorsal hem in females well developed displaying the typical checkered colour pattern. Posteroexterior angles of DELTg 5-7 increasingly protruding.

Venter. Ventral hem in females well developed. Spiracle 2 ventral; 3-4 sublateral, 3 about 1 - 1½ spiracle widths from lateral margin in females and 1 or just less in males, 4 about ½ - 1 spiracle widths from lateral margin in females and about ¼ width in males, sometimes marginally visible from above; 5-7 lateral and visible from above; 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 308-309. Removed parameres as in Figs 304-307.

Chromosome number: 2n(♂) = 28XY.

Habitat and distribution: Probably confined to the montane evergreen forest at Mariepskop in Mpumalanga (Fig 254).

Etymology: From Mariepskop, the type locality of the species. Although the recommended latinisation of the name derived from this locality is "mariepskopensis", I decided on the name "marieps" in accordance with its use in other species unique to this forest, for example the butterfly *Charaxes marieps*.

Discussion: At first I considered to describe *Dundocoris marieps* as a subspecies of *Dundocoris transvaalensis* as some of the differences may probably be explained by allometry. However, after careful consideration of all the differences between these taxa I am convinced that it justifies specific status. Mariepskop is also renowned for its unique fauna and flora and this is yet another example thereof.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Mpumalanga**. ♂ holotype: Mariepskop forest, nr. Hoedspruit, 24°33′S 30°54′E, 4.x.1981, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 80 paratypes as follows: 34♂♂ 37♀♀: Same data as holotype (DHJS, TMSA); 1♂ 4♀♀: S Afr., E. Transvaal, Mariepskop, 24°35′S 30°50′E, 5.v.1981, leg. Endrödy-Younga (TMSA); 2♂♂ 2♀♀: Mariepskop, Transvaal, Humus, viii 1960 (TMSA).

9.1.4 *Dundocoris begemanni* spec. nov., Figs 310-317.

Length: ♂ 3,6 - 3,8 mm; ♀ 4,0 - 4,7 mm.
Width: ♂ 1,6 - 1,8 mm; ♀ 1,8 - 2,2 mm.
Diagnostic measurements are given in Table 9.6.

Table 9.6. Measurements (in mm) of *Dundocoris begemanni* spec. nov.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range	AT#	N	Mean	SD	Range
Total	length	3.74	2	3.71	0.045	3.67-3.75	4.33	6	4.29	0.202	4.07-4.64
	width	1.71	2	1.69	0.023	1.67-1.71	1.98	6	1.93	0.103	1.82-2.11
Head	length	0.68	2	0.67	0.012	0.66-0.68	0.73	6	0.72	0.026	0.69-0.77
	width	0.72	2	0.71	0.011	0.70-0.72	0.75	6	0.76	0.013	0.74-0.79
Pronotum	length	0.39	2	0.39	0.005	0.38-0.40	0.43	6	0.42	0.027	0.38-0.46
	width	1.21	2	1.21	0.001	1.21-1.22	1.32	6	1.31	0.049	1.24-1.38
Tergal disk	length	1.01	2	1.02	0.020	1.00-1.04	1.43	6	1.37	0.073	1.28-1.46
	width	1.11	2	1.09	0.019	1.07-1.11	1.21	6	1.25	0.095	1.13-1.41
Antennal segments	I	0.37	2	0.35	0.015	0.34-0.37	0.37	6	0.37	0.012	0.34-0.39
	II	0.23	2	0.22	0.013	0.20-0.23	0.23	6	0.22	0.017	0.19-0.24
	III	0.33	2	0.33	0.003	0.33-0.34	0.34	6	0.33	0.012	0.31-0.35
	IV	0.26	2	0.25	0.004	0.25-0.26	0.27	10	0.26	0.012	0.24-0.27

*** HT = holotype. # AT = allotype.**

Apterous. Body coated with light yellowish brown incrustation. In specimens at hand the thoracic dorsum is lighter than the abdomen where the tergal disk is darkish brown except for the midline anterior and posterior to the central elevation which is light reddish brown. The following description is based on specimens with the incrustation removed.

Head: About 1,05x as wide (across eyes) as long (excluding neck). Genae straight. Antenniferous lobes prominent, diverging anteriorly. Postocular lobes usually well developed, reaching to level of outer margins of eyes or little beyond. Subapical tubercle on clypeus present. Antennae about 1,6x as long as width across eyes, first segment extending beyond apex of genae by about half its length; relative lengths of segments 14:8,5:13:10.

Thorax: Dorsum. Pronotum about 3,1x as wide as long. Lateral lobes elevated, coarsely granulate, lateral margin slightly concave, anterolateral lobes angularly rounded. Disk irregularly excavated.

Mesonotum with median ridge only slightly elevated, comprising 2(1+1) narrow, parallel elevations separated medially by a prominent furrow. Disk smooth on anterior margin, mesally adjacent to median ridge and laterally adjacent to lateral lobes; tuberculate posteromedially, with a bisinuate transverse row of tubercles on posterior margin. Lateral lobes coarsely granulate, slightly reflexed.

Metanotal disk with 2(1+1) smooth comma-shaped areas anterolaterally, tuberculate laterally where it is indistinct from tuberculate lateral lobes; a transverse row of tubercles is present on its posterior border. Median ridge with 2(1+1) elongate suboval elevations separated by a median depression with a elongate bar-like slight elevation in the centre, the latter usually reaching posteriorly to the posterior margin of MTg 1.

MTg 1 comprising 2(1+1) transverse ridges with smooth but uneven surface, only moderately elevated relative to metanotum; medially separated by a depression with the above mentioned bar-like elevation in its centre. MTg 1 separated anterolaterally from metanotum by a suture and posterolaterally from MTg 2 by a well developed suture.

MTg 2 longer than MTg 1 (especially in females), surface smooth and shining except for 2(1+1) submedian and 2(1+1) sublateral well developed longitudinal ridges; a few small tubercles may be present just lateral of submedian ridges.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,07x as wide as long in males but about 1,1x as long as wide in females, very flat and only elevated at central hump. Carinae separating glabrous impressions nodulate, weakly developed or obliterated against lateral margin of tergal disk; sublateral carina on MTg 3 usually more elevated and prominent than others and often not nodulate. Dorsal hem of females indistinct and checkered pattern of DELTg's at most vaguely recognizable. Postero-exterior angles of DELTg 3-5 not protruding, that of 6-7 only very slightly.

Venter. Ventral hem in females indistinct. Spiracle 2 ventral; 3-4 sublateral, 3 nearly 2 spiracle widths from lateral margin in females and about 1 spiracle width in males, 4 more than 1 spiracle width from lateral margin in females and about half a spiracle width in males; 5-7 lateral and visible from above; 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 316-317. Removed parameres as in Figs 312-315.

Chromosome number: 2n(♂) = 26XY.

Habitat and distribution: The specimens have been collected in a small piece (much less than a square kilometre) of indigenous evergreen forest near Injasuti in the Giants Castle National Park in the Kwazulu-Natal Drakensberg mountains (Fig. 254).

Etymology: I dedicate this species to my friend and fellow entomologist Deon Begemann who has accompanied me on various field trips and other adventurous outings.

Discussion: *Dundocoris begemanni* is related to the previous three species but can be distinguished from them by being more elongate oval in general body form with DELTg 5-7 much less protruding and the tergal disk more elongate, it is also much more dorsoventrally compressed with the tergal disk only slightly elevated along the median line. It is probably closest related to *Dundocoris transvaalensis* from which it can (apart from the above-mentioned) be distinguished by having antennal segment 1 extending beyond the genae by about half its length and being decidedly longer than segment 3.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: nr. Injasuti, Giants Castle Reserve, 29°06′S 29°29′E, 3.ii.1983, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 4♂♂ 8♀♀ paratypes with the same data as the holotype.

9.1.5 *Dundocoris stuckenbergi* Kormilev 1961, Figs 318-333.

Redescription:

Length: ♂ 4,0 - 4,9 mm; ♀ 5,0 - 6,0 mm.

Width: ♂ 1,8 - 2,3 mm; ♀ 2,4 - 3,1 mm.

Diagnostic measurements are given in Tables 9.7 and 9.8.

Apterous. Male oval, female ovate. Body coated with a yellowish incrustation resulting in a chestnut brown appearance. The following description is based on specimens with the incrustation removed.

Head: Marginally wider (across eyes) as long (neck not included). Genae usually slightly diverging anteriorly. Antenniferous lobes prominent, slightly diverging anteriorly. Postocular tubercles small, not reaching to level of outer margins of eyes. Subapical tubercle on clypeus usually well developed. Antennae about 2x as long as width across eyes, first segment long, extending beyond apex of genae by about ⅔ its length, relative lengths of segments: 17:9,7:21,5:10.

Thorax: Dorsum. Pronotum about 3x as wide as long. Lateral lobes not well delimited from disk, densely granulate laterally, lateral margin distinctly concave, strongly diverging posteriorly, anterolateral angles projected anteriorly to collar. Disk irregularly excavated, with 2(1+1) variable smooth areas adjacent to median furrow. Transverse ridge behind collar usually with a slight depression.

Mesonotal median ridge comprising 2(1+1) parallel longitudinal ridges, separated medially by a longitudinal suture except at extreme posterior where they are usually confluent, forming a median wedge between the elevations of metanotal median ridge, reaching the anterior margin of MTg 1. Disk smooth anteromedially and laterally, further irregularly excavated and with a row of tubercles on its posterior border which often link up with the median ridge. Lateral lobes coarsely granulate, lateral margins straight or very slightly concave.

Metanotal median ridge comprising 2(1+1) suboval elevations well separated by the posterior extension of the mesonotal median ridge. Disk with 2(1+1) sub comma-shaped glabrous areas anteriorly and a transverse row of tubercles on its posterior margin where it is completely fused to MTg 1. Lateral lobes coarsely granulate, lateral margins straight or very slightly concave.

MTg 1 elevated relative to metanotum for median half, rest on same level - comprising 2(1+1) curving ridges running posteriorly and laterally along posterior margin, with uneven surface, separated medially by a prominent furrow; rest of MTg 1 with irregular depressions and elevations.

MTg 2 subequal in length to MTg 1, separated from it by being on a lower level and a suture laterally, surface fairly smooth except for 2(1+1) submedian longitudinal elevations separated by a median furrow and 2(1+1) sublateral longitudinal elevations. The area between these elevations on more or less the same height and elevations often posteriorly confluent with these areas.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,22x as wide as long in males and 1,08x in females; very moderately elevated along median line. Carinae separating glabrous impressions entire, usually prominent, Y-shaped and not reaching lateral border of tergal disk. Dorsal hem of DELTg 2-7 very well developed in females and even present (although much narrower) in males. Posteroexterior angles of DELTg 4-7 increasingly protruding.

Venter. Ventral hem in females present on all VELTg's. Spiracle 2 ventral, 3 nearly lateral, usually less than a quarter spiracle width from lateral margin but sometimes further in females, usually but not always visible from above; 4-7 lateral and visible from above; 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 324-325, 332-333. Removed parameres as in Figs 320-323, 328-331.

Chromosome number: 2n(♂) = 26XY or 28XY. The 28XY subspecies (ngomensis) possesses much larger sex chromosome than the 26XY nominate subspecies indicating extensive karyotypic evolution other than fusion or fission of chromosomes.

Habitat and distribution: Montane evergreen forests in Kwazulu-Natal (Fig. 255).

Discussion: *Dundocoris stuckenbergi* can be distinguished from all other species by the combination of its long and slender antennae which are more than 1,95x as long as width across eyes and its spiracle pattern where spiracle 3 is usually visible from above and 4 is always visible from above. *Dundocoris nigromaculatus* also possesses long slender antennae but spiracles 3 and 4 are sublateral, more than one spiracle width from lateral margin and never visible from above; furthermore it is larger, antennal segment 1 is relatively shorter and segment 2 is longer than 4.

Except for the specimens belonging to the two subspecies I also collected a male and female at Dhlinza forest. The male was used to make a cytogenetic preparation. The female is smaller than the other specimens and it possibly represent another subspecies. The chromosome number of the male is 2n = 28XY and its karyotype is very similar to that of *D. stuckenbergi ngomensis*, except that the sex chromosomes are markedly smaller. I shall refrain from describing it as a subspecies until I have more specimens for comparison and cytogenetic analysis.

9.1.5.1 *Dundocoris stuckenbergi stuckenbergi* Kormilev 1961, Figs 318-325.

Length: ♂ 4,0 - 4,6 mm; ♀ 5,3 - 5,5 mm.
Width: ♂ 1,8 - 2,2 mm; ♀ 2,7 - 2,8 mm.
Diagnostic measurements are given in Table 9.7.

Table 9.7. Measurements (in mm) of *Dundocoris stuckenbergi stuckenbergi* Kormilev.

STRUCTURE		MALES					FEMALES			
		HT*	N♦	Mean	SD	Range	N♦	Mean	SD	Range
Total	length	4.08	4	4.33	0.240	4.08-4.58	2	5.42	0.058	5.37-5.46
	width	1.90	4	2.02	0.168	1.85-2.20	2	2.73	0.045	2.70-2.77
Head	length	0.79	4	0.79	0.039	0.74-0.84	2	0.87	0.012	0.86-0.89
	width	0.83	4	0.85	0.031	0.81-0.89	2	0.88	0.014	0.87-0.90
Pronotum	length	0.44	4	0.48	0.043	0.43-0.52	2	0.55	0.029	0.53-0.58
	width	1.35	4	1.44	0.094	1.35-1.54	2	1.62	0.053	1.58-1.67
Tergal disk	length	1.07	4	1.13	0.071	1.06-1.21	2	1.64	0.017	1.63-1.66
	width	1.31	4	1.39	0.078	1.31-1.47	2	1.76	0.037	1.73-1.79
Antennal segments	I	0.49	4	0.51	0.026	0.48-0.55	2	0.55	0.022	0.53-0.57
	II	0.29	4	0.30	0.013	0.28-0.33	2	0.33	0.010	0.32-0.34
	III	0.66	4	0.67	0.026	0.64-0.71	2	0.69	0.007	0.68-0.70
	IV	0.30	4	0.31	0.008	0.30-0.33	2	0.29	0.001	0.29-0.30

*** HT = holotype.**
♦ All ♂♂ and 1 ♀ from Town Bush, 1 ♀ from Shaws Wood farm.

Chromosome number: 2n(♂) = 26XY.

Habitat and distribution: Montane evergreen forests in the Karkloof area in Kwazulu-Natal (Fig. 255).

This subspecies is morphological indistinguishable from the next one and the only constant difference seem to be the different chromosome number and karyotype.

MATERIAL EXAMINED: **SOUTH AFRICA. Kwazulu-Natal.** ♂ holotype: Town Bush, Pietermaritzburg, 2.ix.1960, B. & P. Stuckenberg (NMSA); 5♂♂ 2♀♀: ditto, 29°33'S 30°20'E, 31.i.1983 D.H. Jacobs (DHJS); 1♂: ditto, Humus, x.1960, Z.A 22 (no collector given) (TMSA); 1♀: Shaws Wood farm, Karkloof, 29°19'S 30°18'E, 31.i.1983, D.H. Jacobs (DHJS).

9.1.5.2 *Dundocoris stuckenbergi ngomensis* subspec. nov., Figs 326-333.

Length: ♂ 4,0 - 4,9 mm; ♀ 5,0 - 6,0 mm.
Width: ♂ 1,8 - 2,3 mm; ♀ 2,4 - 3,1 mm.
Diagnostic measurements are given in Table 9.8.

Table 9.8. Measurements (in mm) of *Dundocoris stuckenbergi ngomensis* subspec. nov. from Ngome forest.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range$	AT#	N	Mean	SD	Range$
Total	length	4.47	10	4.53	0.148	4.05-4.88	5.48	10	5.55	0.294	5.05-5.94
	width	2.09	10	2.12	0.059	1.87-2.23	2.71	10	2.74	0.165	2.46-3.05
Head	length	0.88	10	0.86	0.031	0.77-0.91	0.96	10	0.95	0.035	0.87-0.99
	width	0.90	10	0.88	0.030	0.83-0.94	0.97	10	0.97	0.027	0.89-1.01
Pronotum	length	0.50	10	0.52	0.032	0.42-0.59	0.60	10	0.58	0.030	0.51-0.64
	width	1.49	10	1.54	0.042	1.32-1.49	1.69	10	1.73	0.087	1.51-1.84
Tergal disk	length	1.14	10	1.16	0.046	1.07-1.15	1.57	10	1.63	0.096	1.47-1.79
	width	1.39	10	1.42	0.037	1.29-1.49	1.74	10	1.78	0.085	1.61-1.90
Antennal segments	I	0.55	10	0.53	0.025	0.49-0.56	0.56	10	0.57	0.018	0.52-0.60
	II	0.32	10	0.31	0.021	0.28-0.34	0.32	10	0.31	0.011	0.29-0.33
	III	0.72	10	0.68	0.051	0.59-0.77	0.71	10	0.70	0.031	0.65-0.76
	IV	0.32	10	0.31	0.016	0.29-0.36	0.31	10	0.33	0.017	0.30-0.36

*** HT = holotype. # AT = allotype.**
$ May include measurements of specimens other than those used for statistical analysis.

Chromosome number: 2n(♂) = 28XY.

Habitat and distribution: Thus far only collected in the Ngome forest near Louwsburg (Fig. 255).

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Ngome forest station, nr. Louwsburg, 27°49'S 31°25'E, 20-24.i.1983, D,H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 71♂♂ 34♀♀ paratypes: ditto (DHJS, TMSA).

9.1.6 *Dundocoris nigromaculatus* Heiss & Jacobs, Figs 334-341.

Length: ♂ 4,2 - 5,3 mm; ♀ 5,2 - 6,8 mm.
Width: ♂ 2,0 - 2,7 mm; ♀ 2,8 - 3,5 mm.
Diagnostic measurements are given in Table 9.9.

Table 9.9. Measurements (in mm) of *Dundocoris nigromaculatus* Heiss & Jacobs.

STRUCTURE		MALES				FEMALES			
		♣N	Mean	SD	Range$	♣N	Mean	SD	Range$
Total	length	10	4.83	0.316	4.23-5.26	10	6.00	0.425	5.26-6.75
	width	10	2.38	0.126	2.08-2.63	10	3.14	0.216	2.82-3.45
Head	length	10	0.92	0.046	0.81-1.02	10	1.02	0.049	0.92-1.11
	width	10	0.93	0.034	0.85-0.98	10	1.02	0.048	0.94-1.08
Pronotum	length	10	0.60	0.030	0.52-0.65	10	0.66	0.034	0.60-0.76
	width	10	1.65	0.082	1.43-1.77	10	1.86	0.083	1.70-2.09
Tergal disk	length	10	1.29	0.077	1.11-1.40	10	1.87	0.123	1.67-2.10
	width	10	1.57	0.084	1.41-1.71	10	2.00	0.128	1.78-2.18
Antennal segments	I	10	0.47	0.028	0.42-0.50	10	0.52	0.026	0.45-0.54
	II	10	0.33	0.015	0.29-0.36	10	0.36	0.019	0.32-0.39
	III	10	0.71	0.039	0.59-0.78	10	0.74	0.063	0.64-0.84
	IV	10	0.31	0.011	0.28-0.34	10	0.33	0.020	0.30-0.37

*** HT = holotype. # AT = allotype.**
$ May include measurements of specimens other than those used for statistical analysis.
♣ 4♂♂ 5♀♀ from Ngoye forest, 3♂♂ 3♀♀ from Dhlinza forest and 3♂♂ 2♀♀ from Umlalazi nature reserve.

Male. Body oval, shining and granular beneath incrustation. Colour yellowish-brown, black are the anterolateral angles of DELTg 2-7, a spot at middle of the elevation of tergal disk, the pygophore in male, MTg 7 and 8 medially and tergite 9 in female. Lateral margins of body finely granulate, the granules bearing small, stiff erect bristles.

Head: Length including neck/width across eyes 1.02/0.96; anterior process of genae straight with blunt apices, reaching 1/2 of antennal segment 1. Clypeus with a prominent tubercle anterodorsally Antenniferous spines slightly diverging anteriorly, apices acute. Eyes small, globose. Postocular tubercles small and acute, reaching outer border of eyes, posterior margin converging to constricted neck. Vertex with three rows of longitudinal carinae, depressed laterad before eyes. Antennae 2.08x as long as width across eyes, lengths of segments 1-4=0.5:0.387:0.775:0.34; first segment thickest, tapering towards base and apex; second thinner, enlarged posteriorly, third is the longest and twice as long as second, thin, slightly enlarged at apex; fourth fusiform with pilose conical apex. Rostrum short, not reaching posterior margin of head, arising from a slit-like atrium. Rostral groove wide and closed posteriorly, its lateral margins granulate.

Thorax. Pronotum length/width across posterior lobes 0.625/1.75, with a thick, ring-like collar which bears 2(1+1) small round tubercles dorsolaterally and 2(1+1) large, projecting tubercles laterally on a lower level. Lateral lobes slightly upturned, surface densely granular, incised before collar. Anterolateral angles projecting over collar. Posterolateral lobes rounded, projecting, lateral margins granulate and concave. Disk separated from collar by a deep sulcus and a transversal carina, with a longitudinal groove widening at base. Surface rugose. Posterior margin convex.

Mesonotum wider than pronotum, width across posterior lobe 2.25 mm. Subtriangular median elevation with a longitudinal sulcus anteriorly, producing posteriorly into a thin ridge which reaches anterior margin of MTg 2. Lateral lobes with 2(1+1) smooth oblique plates adjacent to median ridge, then rugose, lateral margins slightly reflexed, granulate and converging anteriorly.

Metanotum longer and wider than mesonotum, width across posterior lobe 2.5, with 2(1+1) elevated oval sclerites laterad of projecting metanotal ridge; fused with bisinuate MTg 1 which has the shape of 2(1+1) curved, elevated transversal ridges. Lateral lobes with 2(1+1) smooth round plates with a row of distinct granules posteriorly, then rugose, lateral margins reflexed and converging anteriorly, constricted posteriorly.

MTg 2 depressed, separated from MTg 1 anterolaterally by a thin suture, with 2(1+1) L-shaped elevations laterad of median groove and 2(1+1) short ridges on posterolateral angles.

Abdomen. Tergal plate with deep glabrous impressions, the submedian ones separated by Y-shaped carinae which do not reach lateral margin of tergal disk, roundedly elevated along median line with highest point on posteriorly producing MTg 3. Around scent glands surface transversely striate. DELTg 1-3 fused, reaching anteriorly to posterolateral angle of metanotum. Posteroexterior angles of DELTg 2-7 with small but increasing rounded lobes, formed by the reflexed ventral laterotergites. Surface of DELTg's rugose.

MTg 7 in male raised medially, with a feeble transverse ridge before posterior margin and 2(1+1) prominent tubercles anterolaterally. Pygophore pyriform with rugose surface (Figs 340-341), paratergites 8 slender, not reaching apex of pygophore. Parameres as Figs 336-339.

MTg 7 in female with a transverse granular carina posteriorly, paratergites 8 produced posteriorly, not reaching apex of tricuspidate tergite 9.

Ventral side: Pro-, meso- and metasternum separated by a sulcus, with 2(1+1) lateral projections which are contiguous with coxae. Sternites 1-3 fused. Spiracles 2 ventral, far from lateral margin, 3 and 4 ventral and close to margin, 5-7 lateral and visible from above, 8 subterminal.

Legs: slender, trochanters fused with femora, parempodia and pseudopulvilli present.

Chromosome number: 2n(♂) = 20XY.

Habitat and distribution: Coastal and Montane evergreen forests in northern Kwazulu-Natal (Fig. 255).

Etymology: Nigromaculatus = 'black spot' referring to the black coloration of the central hump of the tergal disk.

Discussion: *D. nigromaculatus* can be distinguished from all other species by a combination of its long antennae (more than 2x as long as width across eyes), its large size and antennal segment 2 being distinctly longer than segment 4. It is related to *D. stuckenbergi* and *D. flavilineatus* from which it can be distinguished as discussed under those species respectively.

MATERIAL EXAMINED: Holotype ♂: South Africa, Kwazulu-Natal, St. Lucia 25. x.81 leg. Klapperich (BMNH); 192 paratypes as follows: 2♂♂ 2♀♀: collected with holotype (EHIA); 6♂♂ 3♀♀: Kwazulu-

Natal, Umlalazi Nat. Reserve nr. Mtunzini, 28°58'E, viii.85 (EHIA); 14♂♂ 6♀♀: ditto. 21-23.viii.1985, (DHJS); 9♂♂ 5♀♀: Kwazulu-Natal, Ngoye Forest, 28°50'S 31°43'E (EHIA); 68♂♂ 20♀♀: ditto, ll-12.xii.1980, (DHJS); 10♂♂ 8♀♀: ditto, 22.viii.1985 (DHJS); 12♂♂ 8♀♀: Kwazulu-Natal, Dhlinza Forest, nr. Eshowe, 24°54'S 31°27'E (EHIA); 8♂♂ 8♀♀: ditto, 21.viii.1985 (DHJS); 3♀♀: ditto, 12.iv.1980 (DHJS).

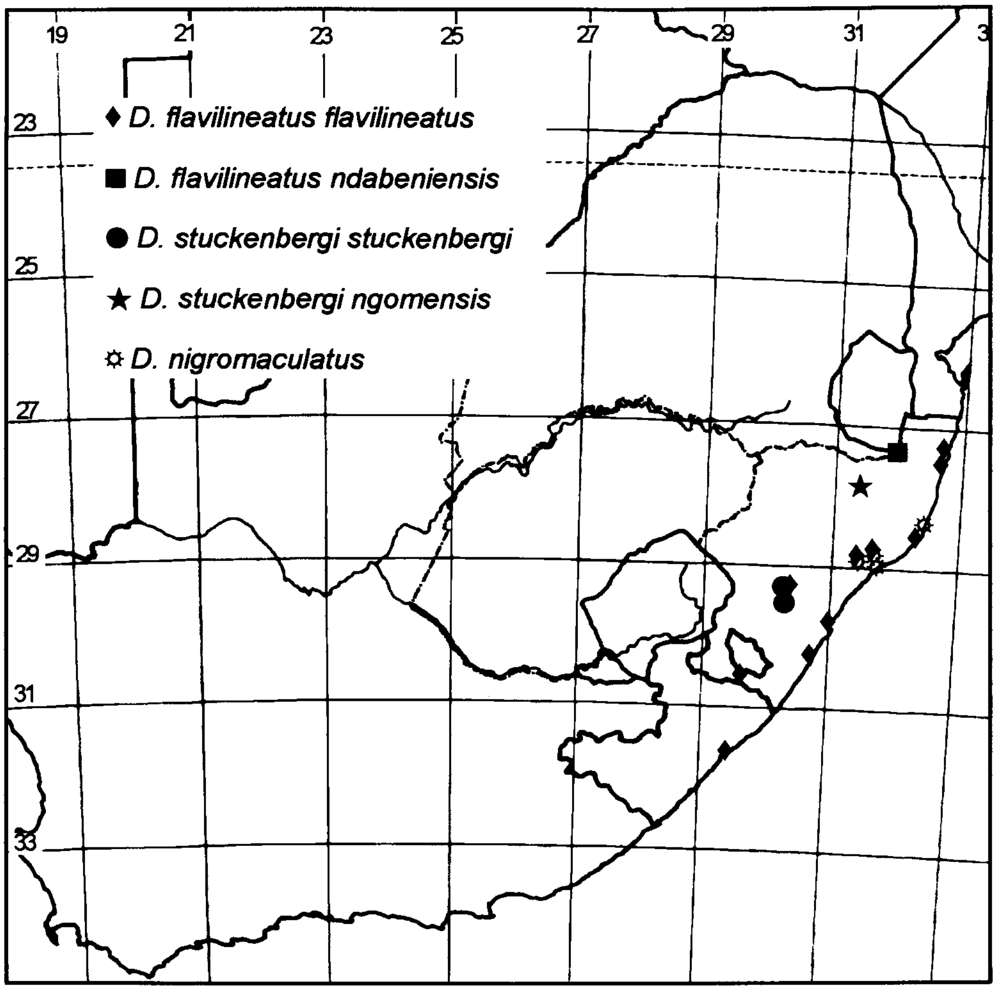


Figure 255. Distribution of *Dundocoris* species and subspecies.

9.1.7 *Dundocoris flavilineatus* spec. nov., Figs 342-357.

Length: ♂ 4,2 - 5,7 mm; ♀ 5,7 - 7,2 mm.

Width: ♂ 1,9 - 2,9 mm; ♀ 2,7 - 3,8 mm.

Diagnostic measurements are given in Tables 9.10 and 9.11.

Apterous. Broadly oval. Body coated with a whitish incrustation forming a characteristic colour pattern in specimens not heavily coated (presumably younger specimens). Thorax, including MTg 1 white but with 2(1+1) sub-comma-shaped glabrous non-incrustate chestnut-brown areas on mesonotum, 2(1+1) comma-shaped ones on metanotum and a few small ones on pronotum; MTg 2 white medially but dark brown or chestnut brown and non-incrustate laterally, visible as 2(1+1) sinuate transverse dark bands; tergal disk with non-incrustate yellowish-white or yellowish brown median band with the central part of the hump often brownish (but not black as in previous species), lateral of this with white incrustation except for callosities which are brown and non-incrustate; DELTg's with white incrustation (except for callosities medially) but dorsal hem in females non-incrustate and with typical checkered pattern; MTg 7 white anteriorly, brown posteriorly; head, collar and genitalia mostly brown. The following description is based on specimens with the incrustation removed.

Head: As wide (across eyes) as long (neck not included). Genae usually straight. Antenniferous lobes prominent, diverging anteriorly. Postocular tubercles small, not reaching level of outer margins of the eyes. Subapical tubercle on clypeus well developed. Antennae about 1,6x as long as width across eyes, first segment extending beyond apex of genae by less than half its length, relative lengths of segments: 13,5:8,5:19:10.

Thorax: Dorsum. Pronotum about 3,1x as wide as long. Lateral lobes densely granulated, rectangularly projected anteriorly to level of anterior margin of collar, posterolateral angles strongly projected laterally, lateral margin strongly concave, strongly converging anteriorly. Disk irregularly excavated with 2(1+1) variable smooth areas adjacent to median furrow. Transverse ridge behind collar with prominent median depression.

Mesonotal median ridge comprising 2(1+1) parallel, fairly narrow, longitudinal ridges, separated medially by a longitudinal furrow except at extreme posterior where they are usually confluent forming a median bar between the elevations of the metanotal median ridge, often extending posteriorly to the posterior margin of MTg 1 or beyond, even to the posterior margin of MTg 2. Disk with narrow smooth areas, anteromedially, anteriorly and sublaterally, rest irregularly excavated and with a row of tubercles on its posterior border which often link up with the median ridge. Lateral lobes granulated, reflexed with posterolateral angles produced laterally.

Metanotal median ridge comprising 2(1+1) suboval elevations, well separated by the posterior extension of the mesonotal median ridge. Disk with 2(1+1) prominent comma-shape glabrous areas anteriorly and a transverse row of tubercles on its posterior margin where it is fused to MTg 1; rest irregularly granulated. Lateral lobes granulated, lateral margins straight, converging anteriorly.

MTg 1 with 2(1+1) transverse curving ridges on its posterior margin and 2(1+1) roundish sublateral elevations anterior to ridge; rest fairly smooth but some irregular nodulations may be present. Ridges medially well separated by a depression.

MTg 2 subequal in length to MTg 1, separated from it laterally by a suture and submedially by being on a lower level, medially completely fused, often with a bar-like slight elevation confluent with posterior extension of mesonotal ridge. Surface of MTg 2 fairly smooth except for 2(1+1) submedian longitudinal elevations (always well separated by a median depression) and 2(1+1) sublateral elevations.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,22x as wide as long in males and 1,05x in females; only slightly elevated along median line which is, even in the specimens with the incrustation removed, of lighter coloration than rest of tergal disk. Carinae usually entire but knobbly adjacent to the longitudinal median elevation, in some specimens the transverse carinae are broken up into irregular nodules. Irregular nodules are usually present on MTg 3 between median elevation and glabrous impression and often on some of the other MTg's as well. Dorsal hem in females prominent on all DELTg's and in males also present on DELTg 1-4. Checkered pattern of DELTg's present, but not as prominent as in *Dundocoris nigromaculatus*. Posteroexterior angles of DELTg 5-7 increasingly protruding.

Venter. Ventral hem in females well developed, sometimes recognizable in males on VELTg 2-4. Spiracle 2 ventral, 3-4 sublateral, 3 more than 2 spiracle widths from lateral margin in both sexes (mediad to margin of ventral hem in females), 4 about 1½ spiracle widths from lateral margin in males and about 2 spiracle widths in females, on margin of ventral hem, 5-7 lateral and visible from above, 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 346-349. Removed parameres as in Figs 350-357.

Chromosome number: 2n(♂) = 28XY or 27X_1X_2Y.

Habitat and distribution: Montane and coastal evergreen forests in Kwazulu-Natal (Fig. 255).

Etymology: Flavilineatus = longitudinal yellow stripe, referring to the yellowish colour of the median line of the tergal disk.

Discussion: In size and general appearance *Dundocoris flavilineatus* is similar to *Dundocoris nigromaculatus* but it can be distinguished by the lack of the black spot and the presence of a yellow band on the tergal disk; by antennal segment 2 being relatively shorter; by its different chromosome number and the relatively wider and stronger anteriorly converging lateral margins of the prothorax. From other *Dundocoris* species its large size immediately sets it apart except perhaps from *Dundocoris stuckenbergi* from which it can immediately be distinguished by spiracles 3 and 4 being sublateral, remote from lateral margin of body, by its shorter first antennal segment and by its broadly oval body form.

Two subspecies are recognized at this stage, one widespread in Kwazulu-Natal and Eastern Cape with a chromosome number of 2n(♂) = 28XY and the other apparently restricted to the Ndabeni forests near Josini with a 2n(♂) = 27X_1X_2Y.

MATERIAL EXAMINED: See under the subspecies.

9.1.7.1 ***Dundocoris flavilineatus flavilineatus* spec. and subspec. nov.**, Figs 342-344, 346-347, 350-354.

Length: ♂ 4,2 - 5,6 mm; ♀ 5,7 - 6,5 mm.
Width: ♂ 1,9 - 2,8 mm; ♀ 2,7 - 3,4 mm.
Diagnostic measurements are given in Table 9.10.

Table 9.10. Measurements (in mm) of *Dundocoris flavilineatus flavilineatus* spec. & subspec. nov.

STRUCTURE		MALES					FEMALES				
		HT[*]	[Φ]N	Mean	SD	Range[$]	AT[#]	[Φ]N	Mean	SD	Range[$]
Total	length	5.27	12	4.92	0.316	4.22-5.60	6.22	12	6.14	0.279	5.71-6.49
	width	2.65	12	2.38	0.200	1.90-2.80	3.34	12	3.11	0.216	2.73-3.39
Head	length	1.01	12	0.93	0.059	0.82-1.04	1.15	12	1.05	0.056	0.97-1.15
	width	1.00	12	0.92	0.050	0.83-1.03	1.07	12	1.03	0.042	0.97-1.11
Pronotum	length	0.63	12	0.56	0.046	0.47-0.67	0.72	12	0.64	0.037	0.58-0.72
	width	1.91	12	1.73	0.125	1.44-1.98	2.13	12	1.93	0.091	1.79-2.13
Tergal disk	length	1.39	12	1.27	0.094	1.05-1.48	1.94	12	1.88	0.123	1.66-2.08
	width	1.71	12	1.57	0.117	1.29-1.82	2.13	12	1.97	0.104	1.78-2.13
Antennal segments	I	0.44	12	0.40	0.022	0.35-0.47	0.49	12	0.44	0.030	0.39-0.49
	II	0.29	12	0.26	0.023	0.21-0.29	0.31	12	0.28	0.020	0.23-0.31
	III	0.70	12	0.57	0.059	0.48-0.70	0.73	12	0.63	0.063	0.53-0.73
	IV	0.33	12	0.30	0.021	0.26-0.33	0.35	12	0.32	0.014	0.30-0.35

[*] HT = holotype. [#] AT = allotype.

[$] May include measurements of specimens other than those used for statistical analysis.

[Φ] 4♂♂ 3♀♀ from Ngoye forest, 4♂♂ 4♀♀ from Manzengwenya, 4♂♂ from Scottburgh, 4♀♀ from Ehlatini farm and 1♀ from Shaws Wood farm.

The nominate subspecies occurs widespread in Kwazulu-Natal and Eastern Cape and has a chromosome number of 2n(♂) = 28XY.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Ngoye forest reserve, nr Empangeni, 28°50'S 31°43'E, 11-12.xii.1980, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 135 paratypes as follows: 1♂ 7♀♀: Manzengwenya, Kwazulu, 27°16'S 32°46'E, 3-7.xii.1980, D.H. Jacobs (DHJS, TMSA); 18♂♂ 4♀♀: nr. Manzengwenya, Kwazulu, 27°18'S 32°45'E, 6.xii.1980, D.H. Jacobs (DHJS, TMSA); 2♂♂ 1♀: Sordwana Bay, Natal, 27°32'S 32°40'E, 23.vii.1977, D.H Jacobs (DHJS); 3♀♀: ditto, 4.ix.1978 (DHJS); 1♀: Nhlabane forest nr. St. Lucia, 2832 CB, 3.ii.1991, M. Vogt (DHJS); 3♂♂ 3♀♀: nr. Maphelana, Natal, 28°26'S 32°25'E, 10.xii.1980, D.H. Jacobs (DHJS); 33♂♂ 8♀♀: Same data as holotype (DHJS, TMSA); 13♂♂ 4♀♀: Dhlinza forest, Eshowe, 24°54'S 31°27'E, 12.iv.1980, D.H. Jacobs (DHJS, TMSA); 2♂♂: ditto, 21.viii.1985, (DHJS); 1♂ 4♀♀: Shaws Wood farm, Karkloof, 29°19'S 30°18'E, 1.ii.1983, D.H. Jacobs (DHJS); 4♀♀: Ehlatini farm, Karkloof, 29°19'S 30°17'E, 1.ii.1983, D.H. Jacobs (DHJS, TMSA); 1♀: Umhlanga Rocks Nature Reserve, nr. Durban 29°42'S 31°06'E, 11.ix.1991, D.H. Jacobs (DHJS); 1♂ 2♀♀: nr. Durban, 29°45'S 31°04'E, 4.iv.1980, D.H. Jacobs (DHJS); 10♂♂ 3♀♀: nr. Scottburgh, 30°15'S 30°46'E, 25.i.1983, D.H. Jacobs (DHJS, TMSA); 1♂: Lesser Stinkwood forest, nr. Kokstad, 30°33'S 29°43'E, 29.xi.1981, D.H. Jacobs

(DHJS); 3♂♂ 1♀: Mpsheni forest nr. Kokstad, 30°38'S 29°40'E, 30.xi.1981, D.H. Jacobs (DHJS). **Eastern Cape**. 1♀: Mount Thesiger Nature Reserve, Port St. Johns, 31°37'S 29°31'E, 4-5.xii.1981 D.H. Jacobs (DHJS).

9.1.7.2 *Dundocoris flavilineatus ndabeniensis* subspec. nov., Figs 345, 348-349, 355-357.

Length: ♂ 5,6 mm; ♀ 6,7 - 7,2 mm.
Width: ♂ 2,8 mm; ♀ 3,1 - 3,8 mm.
Diagnostic measurements are given in Table 9.11.

Table 9.11. Measurements (in mm) of *Dundocoris flavilineatus ndabeniensis* subspec. nov. from Ndabeni forest.

STRUCTURE		MALE	FEMALES				
		HT*	AT#	N	Mean	SD	Range
Total	length	5.61	6.91	10	6.96	0.151	6.72-7.13
	width	2.79	3.34	10	3.41	0.185	3.18-3.74
Head	length	1.02	1.13	10	1.15	0.031	1.10-1.19
	width	1.03	1.15	10	1.16	0.026	1.12-1.20
Pronotum	length	0.64	0.71	10	0.72	0.020	0.69-0.76
	width	1.98	2.26	10	2.29	0.050	2.22-2.39
Tergal disk	length	1.43	2.10	10	2.10	0.043	2.04-2.18
	width	1.79	2.28	10	2.27	0.070	2.17-2.39
Antennal segments	I	0.44	0.48	10	0.48	0.016	0.45-0.50
	II	0.29	0.32	10	0.31	0.008	0.29-0.33
	III	0.68	0.63	10	0.68	0.037	0.63-0.75
	IV	0.33	0.36	10	0.35	0.007	0.34-0.37

* HT = holotype. # AT = allotype.

Apart from being larger than the nominate subspecies and the different chromosome number of 2n(♂) = $27X_1X_2Y$, there seem to be no clear-cut morphological differences between them. This subspecies is probably restricted to the Ndabeni forests near Josini.

Etymology: From Ndabeni, the type locality.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Ndabeni forest, nr. Josini, 27°22'S 32°00'E, 24.i.1983, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 1♂ 12♀♀ paratypes: ditto. (DHJS, TMSA).

9.1.8 *Dundocoris schoemani* spec. nov., Figs 358-374.

Length: ♂ 3,5 - 4,2 mm; ♀ 4,0 - 5,1 mm.
Width: ♂ 1,7 - 2,0 mm; ♀ 1,9 - 2,6 mm.
Diagnostic measurements are given in Tables 9.12 and 9.13.

Apterous. Male oval, female subovate. Body coated with a yellowish incrustation resulting in a overall brownish appearance of the insect, the thorax usually lighter than the abdomen. The following description is based on specimens with the incrustation removed:

Head: Slightly wider (across eyes) as long (neck not included). Genae straight or slightly diverging anteriorly. Antenniferous lobes prominent, slightly diverging anteriorly. Postocular tubercles small, usually not reaching the level of the outer margins of the eyes. Subapical tubercle on clypeus prominent. Antennae about 1,8x as long as width across eyes, first segment extending beyond apex of genae by about half its length, third segment long and slender, relative lengths of segments: 15,5:10:21:11 (differing slightly between the subspecies).

Thorax: Dorsum. Pronotum about 3x as wide as long. Lateral lobes not well delimited from disk, densely granulated, laterally projected anteriorly to level of anterior margin of collar or beyond; lateral margin slightly concave, diverging posteriorly. Disk irregularly excavated. Transverse ridge behind collar usually with a median depression.

Mesonotal median ridge comprising 2(1+1) parallel, fairly broad, posteriorly widening, longitudinal ridges, separated medially by a prominent and fairly wide longitudinal furrow, ridges never converging posteriorly. Disk smooth anteromedially, anteriorly and sublaterally adjacent to lateral lobes; irregularly excavated posteriorly in middle and one or two tubercles may occur posteromedially where the may link up with the median ridge. Lateral lobes densely granulate, lateral margins straight or slightly rounded.

Metanotal median ridge comprising 2(1+1) subquadrangular elevations, separated by a median depression. Disk with 2(1+1) roughly comma-shaped glabrous areas anteriorly and a transverse row of tubercles on its posterior margin where it is completely fused with MTg 1; rest with some irregular nodules and excavations. Lateral lobes granulate, lateral margins straight, slightly converging anteriorly.

MTg 1 with 2(1+1) transverse ridges on its posterior margin, dilating medially where they occupy the total length of MTg 1 and are separated by only a slight depression; rest with irregular surface and nodulations.

MTg 2 medially shorter than MTg 1 in males, subequal in females, separated from the latter by a suture and being abruptly depressed over its total width. The 2(1+1) submedian 2(1+1) sublateral longitudinal elevations are sometimes connected by a transverse elevation on the posterior margin in front of which some irregular nodules may occur.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,29x as wide as long in males and 1,18x in females; moderately elevated along median line. Carinae separating glabrous impressions Y-shaped, usually entire but margins often uneven and median carina on MTg 3 sometimes broken up in irregular nodules. Nodules usually present between median carina and glabrous impressions especially on MTg 3, 5 and 6. Dorsal hem in females present on all DELTg's, usually not or only vaguely discernable in males. Posteroexterior angles of DELTg 5-7 increasingly protruding.

Venter. Ventral hem in females present on all VELTg's but usually not prominent. Spiracle 2 ventral, 3 lateral or very nearly so and visible from above, 4-7 lateral and visible from above, 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 365-366, 373-374. Dorsal view of unremoved parameres (Figs 366, 374) shows that the median part is well elevated in relation to the rest. This elevated part is also evident in the removed parameres (Figs 361-364, 369-372).

Chromosome number: 2n(♂) = 26XY.

Habitat and distribution: Evergreen montane and coastal forests in the Eastern Cape.

Etymology: I have pleasure in dedicating this species to my friend and fellow entomologist, Dr. A.S. Schoeman who has been of great assistance to me in difficult circumstances.

Discussion: *Dundocoris schoemani* is set apart from all other species by the combination of its spiracle pattern where spiracle 3 is always visible from above, its relatively long 3rd antennal segment which is about 1,36x as long as segment 1 and more than twice as long as segment 2, and its mesonotal median ridge where the longitudinal elevations never converge or meet posteriorly.

It shares the same spiracle pattern with *Dundocoris stuckenbergi* but can immediately be distinguished by its relatively shorter antennae (less than 1,9x as long as width across eyes) and shorter antennal segment 1 (extending beyond apex of genae by just about half its length), and its mesonotal median ridge as discussed above.

Dundocoris schoemani is closely related to *Dundocoris scholtzi* from which it can be distinguished by the lateral position of spiracle 3, and by having antennal segment 3 more than 1,3x as long as segment 1 (less than 1,1x in the latter), MTg 1 which is medially longer than MTg 2 in males and the mesonotal ridge as discussed above.

Two subspecies are currently recognized, mainly on account of different karyotypes.

9.1.8.1 ***Dundocoris schoemani schoemani*** **spec. et subspec. nov.**, Figs 359-366.

Length: ♂ 3,7 - 4,2 mm; ♀ 4,4 - 5,1 mm.
Width: ♂ 1,7 - 2,0 mm; ♀ 1,9 - 2,6 mm.
Diagnostic measurements are given in Table 9.12.

Table 9.12. Measurements (in mm) of *Dundocoris schoemani schoemani* spec. nov.

STRUCTURE		MALES					FEMALES				
		HT*	N♦	Mean	SD	Range$	AT#	N♦	Mean	SD	Range$
Total	length	3.97	10	3.98	0.110	3.78-4.13	4.76	10	4.75	0.183	4.47-5.07
	width	1.80	10	1.84	0.062	1.73-1.93	2.27	10	2.30	0.130	1.99-2.53
Head	length	0.71	10	0.71	0.016	0.68-0.73	0.80	10	0.78	0.022	0.74-0.82
	width	0.77	10	0.76	0.019	0.72-0.79	0.84	10	0.82	0.029	0.77-0.87
Pronotum	length	0.49	10	0.48	0.020	0.43-0.50	0.52	10	0.52	0.040	0.45-0.59
	width	1.39	10	1.38	0.041	1.28-1.44	1.48	10	1.51	0.067	1.38-1.61
Tergal disk	length	0.97	10	0.99	0.033	0.94-1.04	1.33	10	1.32	0.062	1.21-1.44
	width	1.24	10	1.25	0.032	1.19-1.30	1.46	10	1.52	0.058	1.43-1.64
Antennal segments	I	0.39	10	0.38	0.010	0.36-0.42	0.41	10	0.41	0.009	0.39-0.43
	II	0.25	10	0.25	0.007	0.22-0.26	0.25	10	0.26	0.012	0.24-0.29
	III	0.50	10	0.53	0.024	0.49-0.59	0.56	10	0.57	0.028	0.52-0.61
	IV	0.26	10	0.27	0.009	0.25-0.29	0.29	10	0.28	0.008	0.27-0.30

* HT = holotype. # AT = allotype.
$ May include measurements of specimens other than those used for statistical analysis.
♦ 3♂♂ 3♀♀ from Kambi Forest Reserve, 3♂♂ 3♀♀ from Ku-Manina forest and 4♂♂ 4♀♀ from Baziya forest.

Chromosome number: 2n(♂) = 26XY.

The nominate subspecies is very similar to *D. schoemani dwesaensis* and the only reliable differences seem to be the different karyotype. In the former all the autosomes form a gradual size series while the largest autosome of *D. schoemani dwesaensis* is distinctly larger than the next largest one (compare Figs 267 and 268). On average *D. schoemani dwesaensis* is smaller and little stouter than *D. schoemani schoemani* resulting in a more transverse tergal disk (1,32x as wide as long in males and 1,20x in females versus 1,27x and 1,15x respectively). There is also on average a slight difference in the relative length of the antennal segments (15,3:10:20,8:11,5 in *D. schoemani dwesaensis* and 15,5:10:21,4:10,8 in *D. schoemani schoemani*). It is, however, often impossible to classify individuals on account of these small differences and for example, the specimens from Ntsubane forest and Silaka forest are intermediate in some of these characters. They are included in the nominate subspecies but it may prove to be a mistake when their karyotype becomes known.

Habitat and distribution: So far the nominate subspecies has mainly been collected in montane evergreen forests of the Eastern Cape.

MATERIAL EXAMINED: **Eastern Cape**. ♂ holotype: Baziya forest, nr. Umtata, 31°34′S 28°25′E, 8-9.xii.1981, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 152 paratypes as follows: 2♂♂ 2♀♀: S. Afr. Transkei, Ntsubane forest, 31°27′S 29°44′E, 25.xi.1987, E-Y:2537, fungi & for. litter, leg.

8.xii.1981, D.H. Jacobs (DHJS, TMSA); 1♀: S. Afr. Transkei, Silaka Forest Reserve, 31°33'S 29°30'E, 24.xi.1987; E-Y:2533 indig forest litter, leg. Endrödy-Young (TMSA); 16♂♂ 18♀♀: Kumanina forest, nr. Umtata, 31°34'S 28°09'E, 9.xii.1981, D.H. Jacobs (DHJS, TMSA); 33♂♂ 26♀♀: Same data as holotype (DHJS, TMSA); 1♂ 2♀♀: Nquaba forest, nr. Umtata, 31°36'S 28°07'E, 9.xii.1981, D.H. Jacobs (DHJS).

9.1.8.2 *Dundocoris schoemani dwesaensis* spec. et subspec. nov., Figs 367-374.

Length: ♂ 3,5 - 3,9 mm; ♀ 4,0 - 4,7 mm.
Width: ♂ 1,7 - 1,9 mm; ♀ 1,9 - 2,3 mm.
Diagnostic measurements are given in Table 9.13.

Table 9.13. Measurements (in mm) of *Dundocoris schoemani dwesaensis* spec. & subspec. nov. from Dwesa forest.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range	AT#	N	Mean	SD	Range
Total	length	3.65	5	3.65	0.132	3.51-3.87	4.48	9	4.39	0.187	4.03-4.69
	width	1.79	5	1.78	0.060	1.72-1.88	2.25	9	2.18	0.096	1.95-2.28
Head	length	0.69	5	0.67	0.018	0.64-0.69	0.74	9	0.74	0.029	0.69-0.79
	width	0.72	5	0.72	0.010	0.70-0.73	0.78	9	0.78	0.025	0.73-0.82
Pronotum	length	0.40	5	0.40	0.019	0.36-0.42	0.46	9	0.46	0.025	0.41-0.50
	width	1.27	5	1.26	0.020	1.23-1.29	1.41	9	1.41	0.040	1.35-1.47
Tergal disk	length	0.90	5	0.92	0.049	0.84-0.98	1.20	9	1.22	0.048	1.13-1.32
	width	1.21	5	1.21	0.044	1.13-1.27	1.45	9	1.47	0.055	1.40-1.58
Antennal segments	I	0.34	5	0.34	0.006	0.33-0.35	0.37	9	0.36	0.013	0.34-0.39
	II	0.23	5	0.22	0.010	0.20-0.23	0.23	9	0.24	0.007	0.22-0.25
	III	0.48	5	0.46	0.021	0.43-0.49	0.51	9	0.50	0.021	0.44-0.53
	IV	0.27	5	0.27	0.006	0.25-0.28	0.27	9	0.27	0.011	0.25-0.28

*** HT = holotype. # AT = allotype.**

Chromosome number: 2n(♂) = 26XY.

Differences with the nominate subspecies were discussed under the latter. The specimens from Mpame forest are included in this species on account of the proximity of the locations and the fact that both are coastal forests. The chromosome number or karyotype which has not yet been determined, may, however, prove otherwise.

Habitat and distribution: Coastal forests in the Eastern Cape.

MATERIAL EXAMINED: **Eastern Cape.** ♂ holotype: Dwesa forest Transkei, 32°18'S 28°50'E, 10-13.xii.1981 D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 25 paratypes as follows: 1♂ 3♀♀:

Mpame forest, Transkei, 32°05'S 29°02'E, 12.xii.1981, D.H. Jacobs (DHJS, TMSA); 9♂♂ 12♀♀: Same data as holotype (DHJS, TMSA).

9.1.9 ***Dundocoris scholtzi*** **spec. nov.**, Figs 375-382.

Length: ♂ 3,3 - 4,0 mm; ♀ 3,9 - 4,7 mm.
Width: ♂ 1,5 - 1,9 mm; ♀ 1,9 - 2,3 mm.
Diagnostic measurements are given in Table 9.14.

Table 9.14. Measurements (in mm) of *Dundocoris scholtzi* spec. nov. from Ngome forest.

STRUCTURE		MALES					FEMALES				
		HT*	N	Mean	SD	Range$	AT#	N	Mean	SD	Range$
Total	length	3.78	10	3.68	0.134	3.37-3.94	4.36	10	4.35	0.128	3.93-4.62
	width	1.66	10	1.67	0.081	1.56-1.83	2.14	10	2.16	0.079	1.91-2.29
Head	length	0.73	10	0.72	0.015	0.69-0.75	0.78	10	0.79	0.018	0.74-0.82
	width	0.79	10	0.77	0.019	0.74-0.82	0.85	10	0.82	0.033	0.77-0.88
Pronotum	length	0.44	10	0.43	0.017	0.36-0.48	0.43	10	0.46	0.018	0.41-0.50
	width	1.34	10	1.30	0.056	1.22-1.40	1.42	10	1.42	0.047	1.26-1.51
Tergal disk	length	0.94	10	0.90	0.046	0.82-1.00	1.32	10	1.28	0.061	1.16-1.38
	width	1.15	10	1.13	0.068	1.04-1.24	1.39	10	1.40	0.060	1.21-1.52
Antennal segments	I	0.40	10	0.39	0.011	0.37-0.42	0.41	10	0.41	0.016	0.37-0.43
	II	0.24	10	0.24	0.010	0.21-0.26	0.25	10	0.25	0.015	0.23-0.29
	III	0.40	10	0.40	0.021	0.37-0.44	0.41	10	0.42	0.028	0.38-0.48
	IV	0.27	10	0.28	0.010	0.26-0.31	0.28	10	0.29	0.013	0.26-0.32

*** HT = holotype. # AT = allotype.**
$ May include measurements of specimens other than those used for statistical analysis.

Apterous. Male oval, female more ovate. Body coated with a whitish to brownish incrustation. Heavily incrustate specimens uniformly dark brown, slightly incrustate specimens with thorax lighter than abdomen and checkered pattern on margin of female abdomen prominent.

The following description is based on specimens with the incrustation removed:

Head: About 1,05x as wide (across eyes) as long (neck not included). Genae straight or slightly diverging anteriorly. Antenniferous lobes prominent, diverging anteriorly. Postocular lobes small, seldom reaching to level of outer margins of eyes. Subapical tubercle on clypeus present. Antennae about 1,68x as long as width across eyes; first segment long and slender, extending beyond apex of genae by more than half its length; relative lengths of segments: 16:10:17:11,5.

Thorax: Dorsum. Pronotum about 3,05x as wide as long. Lateral lobes not well delimited from disk, granulate lateral margins slightly concave, anterolateral angles usually produced to little beyond the level of the anterior margin of the collar, posterolateral angles angularly produced laterally. Disk irregularly excavated. Transverse ridge behind collar usually with a slight median depression.

Mesonotal median ridge narrow, comprising 2(1+1) long, narrow, parallel longitudinal ridges separated medially by a longitudinal furrow; ridges often converging and confluent at extreme posterior where it then slightly wedge in between the elevations of the metanotal median ridge. Disk smooth anteriorly, anteromedially and anterolaterally; rest irregularly excavated with a bisinuate transverse row of irregular tubercles on posterior margin, usually merging with posterior extremity of median ridges. Lateral lobes densely granulate, lateral margins straight, converging anteriorly.

Metanotal median ridge comprising 2(1+1) suboval elevations, well separated by a median depression. Disk with 2(1+1) irregular smooth areas, often comma-shaped, further with irregular nodules and excavations and a transverse row of nodules on its posterior margin. Lateral lobes densely granulate, lateral margins straight.

MTg 1 fairly strongly elevated relative to metanotum for median half, rest more or less on same level, comprising 2(1+1) transverse ridges separated medially by a prominent depression, in males the ridge has an uneven surface anterolaterally while it is more even with only a sublateral transverse depression in females. MTg 1 is laterally separated from the metanotum by a suture which is more prominent in females.

MTg 2 subequal or slightly longer than MTg 1, abruptly depressed relative to MTg 1 except at median depression, laterally separated by a suture; with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, rest fairly smooth except for some irregular tubercles just laterad of submedian ridges.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,26x as wide as long in males and 1,09x in females, moderately elevated along median line. Carinae separating glabrous impressions entire, prominent, Y-shaped and not reaching lateral border of tergal disk. Dorsal hem well developed in females. Posteroexterior angles of DELTg 5-7 slightly but increasingly protruding.

Venter. Ventral hem present in females but not prominent. Spiracle 2 ventral; 3-4 sublateral, 3 slightly more than a spiracle width from lateral margin in females, less than half a spiracle width in males, not visible from above in both sexes, 4 about half a spiracle width from lateral margin in females and not visible from above, lateral or nearly so in males and usually visible from above; 5-7 lateral and visible from above; 8 subterminal on paratergites. VELTg 7 of males with a transverse, strongly elevated, bulbous elevation running anteromesad from under the spiracle to near the anterior margin in line with the sublateral glabrous impressions of the previous segment.

Genitalia: Pygophore as in Figs 381-382. Removed parameres as in Figs 377-380.

Chromosome number: 2n(♂) = 26XY.

Habitat and distribution: At present only known from the montane evergreen forests in the Ngome wilderness area where it is very common.

Etymology: I dedicate this species to Prof C.H. Scholtz, head of the Department of Zoology and Entomology of the University of Pretoria for his moral and financial support of my research.

Discussion: *Dundocor*[illegible] combination of its long antennal segment 1 (which is more than half as long as width across eyes and surpasses the genae by more than half its length), spiracle 4 of the males which is usually visible from above and the mesonotal median ridge where the longitudinal elevations converge and often merge at posterior extreme.

Dundocoris scholtzi is related to *Dundocoris schoemani* (refer to latter species for differences) and *Dundocoris fuscus* from which it differs in its median ridge (see discussion above), spiracle 4 of males which is not visible from above, the 2(1+1) bulbous elevations on VELTg 7 of males, and the slightly different shape of MTg 1, especially in females.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Ngome forest station, nr. Louwsburg, 27°49'S 31°25'E, 20-24.i.1983, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 450♂♂ 393♀♀ paratypes: Same data as holotype (DHJS, TMSA).

9.1.10 *Dundocoris fuscus* spec. nov., Figs 383-391.

Length: ♂ 3,4 - 4,0 mm; ♀ 4,1 - 4,7 mm.
Width: ♂ 1,5 - 2,0 mm; ♀ 2,0 - 2,4 mm.
Diagnostic measurements are give in Table 9.15.

Table 9.15. Measurements (in mm) of *Dundocoris fuscus* spec. nov.

	STRUCTURE		MARIEPSKOP FOREST					OTHER@			
			HT*	N	Mean	SD	Range	N	Mean	SD	Range
MALES	Total	length	3.67	10	3.67	0.090	3.53-3.80	5	3.62	0.187	3.44-3.94
		width	1.71	10	1.72	0.068	1.56-1.81	5	1.80	0.115	1.69-2.00
	Head	length	0.67	10	0.68	0.019	0.64-0.70	5	0.70	0.014	0.67-0.72
		width	0.74	10	0.75	0.018	0.73-0.78	5	0.76	0.027	0.73-0.81
	Pronotum	length	0.43	10	0.43	0.018	0.40-0.46	5	0.44	0.014	0.42-0.46
		width	1.24	10	1.24	0.038	1.16-1.32	5	1.33	0.048	1.27-1.39
	Tergal disk	length	0.93	10	0.93	0.030	0.89-0.98	5	0.92	0.057	0.87-1.02
		width	1.13	10	1.15	0.040	1.11-1.24	5	1.21	0.074	1.15-1.34
	Antennal segments	I	0.36	10	0.36	0.011	0.33-0.38	5	0.36	0.021	0.34-0.40
		II	0.23	10	0.22	0.010	0.20-0.24	5	0.24	0.008	0.22-0.25
		III	0.37	10	0.37	0.020	0.34-0.42	5	0.39	0.012	0.37-0.40
		IV	0.25	10	0.25	0.010	0.23-0.28	5	0.26	0.011	0.25-0.28
			AT #	N	Mean	SD	Range	N	Mean	SD	Range
FEMALES	Total	length	4.49	10	4.43	0.160	4.16-4.62	3	4.49	0.052	4.43-4.54
		width	2.19	10	2.23	0.101	2.06-2.35	3	2.31	0.037	2.27-2.35
	Head	length	0.76	10	0.75	0.017	0.70-0.78	3	0.77	0.002	0.77-0.78
		width	0.83	10	0.81	0.026	0.77-0.85	3	0.83	0.006	0.82-0.84
	Pronotum	length	0.45	10	0.47	0.024	0.43-0.52	3	0.50	0.009	0.49-0.51
		width	1.37	10	1.41	0.081	1.27-1.54	3	1.50	0.011	1.48-1.52
	Tergal disk	length	1.38	10	1.33	0.065	1,20-1.43	3	1.35	0.015	1.33-1.37
		width	1.51	10	1.46	0.078	1.34-1.59	3	1.49	0.022	1.46-1.51
	Antennal segments	I	0.40	10	0.38	0.014	0.35-0.41	3	0.40	0.004	0.39-0.41
		II	0.26	10	0.24	0.011	0.22-0.27	3	0.27	0.008	0.25-0.28
		III	0.42	10	0.40	0.016	0.37-0.42	3	0.42	0.009	0.41-0.44
		IV	0.27	10	0.26	0.010	0.24-0.29	3	0.28	0.005	0.27-0.29

*** HT = holotype. # AT = allotype.**
@ 3♂♂ 3♀♀ from Grootkloof, 1♂ from Nelshoogte and 1♂ from Bridal Veil Falls.

Apterous. Male oval, female ovate. Body coated with a yellowish or brownish incrustation. Heavily incrustate specimens uniformly dark brown, slightly incrustate specimens with thorax lighter than abdomen and checked pattern on females abdominal margins visible.

The following description is based on specimens with the incrustation removed.

Head: About 1,09x as wide (across eyes) as long (neck not included). Genae straight, extending beyond apex of clypeus for only a short distance. Antenniferous lobes prominent, diverging anteriorly. Postocular lobes variable, usually not reaching level of outer margins of eyes. Subapical tubercle on clypeus present. Antennae 1,6 - 1,65x as long as width across eyes; first segment long, extending beyond apex of genae by about half its length, relative lengths of segments: 15,5:10:16:10,8.

Thorax: Dorsum. Pronotum about 3x as wide as long. Lateral lobes not well delimited from disk, irregularly granulate, lateral margins concave, anterolateral angles produced slightly beyond level of anterior margins of collar, posterolateral angles produced laterally. Disk irregularly excavated. Transverse ridge behind collar with a slight median depression.

Mesonotal median ridge narrow, longitudinal elevations parallel or slightly diverging posteriorly, narrow but usually widening posteriorly, always separated by a prominent, fairly wide median furrow along their total length. Disk with irregular smooth patches anteriorly, medially and laterally, rest irregularly excavated and with irregular nodules, especially along posterior margin where they may link up with the elevations of the median ridge. Lateral lobes coarsely granulate, lateral margins straight, converging anteriorly.

Metanotal median ridge comprising 2(1+1) suboval or subquadrangular elevations, well separated by a median depression. Disk with 2(1+1) more or less comma-shaped smooth areas, rest with irregular nodules and excavations and an irregular transverse row of nodules on its posterior margin. Lateral lobes granulate, lateral margins straight.

MTg 1 moderately elevated relative to metanotum for median half, remainder on approximately the same level; comprising 2(1+1) transverse ridges always separated medially by a prominent and usually fairly wide depression; medially the ridge occupy the total length of MTg 1 but narrows laterally and occupy the posterior half of MTg 1 for about three fifths of its width to where it is partially fused to 2(1+1) sublateral elevations (in line with sublateral elevations of MTg 2); lateral of this it continues as a sinuate bar-like thickening of the posterior and lateral margin of MTg 1; surface anterior to ridge uneven. MTg 1 fused with metanotum but a suture may be vaguely discernable laterally.

MTg 2 usually slightly longer than MTg 1, laterally separated from it by a well developed suture, submedially by the abrupt decline of the ridge on MTg 1 but they are usually fused at the median depression and separated only by a moderate decline. MTg 2 with 2(1+1) submedian ridges which are often L-shaped and 2(1+1) sublateral longitudinal ridges, rest fairly smooth.

Venter and legs: As for genus.

Abdomen: Dorsum. Tergal disk about 1,25x as wide as long in males and 1,1x in females, moderately elevated along median line. Carinae separating glabrous impressions entire, prominent, Y-shaped and not reaching lateral border of tergal disk. Dorsal hem well developed in females. Posteroexterior angles of DELTg 4 - 7 increasingly protruding, especially in males.

Venter. Ventral hem present in females. Spiracle 2 ventral; 3 sublateral, usually about half a spiracle width from lateral margin and sometimes visible from above; 4-7 lateral and visible from above; 8 subterminal on paratergites.

Genitalia: Pygophore as in Figs 390-391. Removed parameres as in Figs 386-389.

Chromosome number: 2n(♂) = 28XY.

Habitat and distribution: Montane evergreen forests in Mpumalanga and Swaziland.

Etymology: fuscus (L) = dark brown, referring to the general colour of specimens.

Discussion: *Dundocoris fuscus* can be distinguished from all other species by a combination of its fairly long first antennal segment (extending beyond apex of genae by about half its length), long third antennal segment (that is distinctly longer than segment one), spiracle 4 which is visible from above in both sexes and the mesonotal median ridge where the longitudinal elevations are separated by a prominent furrow over its total length and never merge at posterior extreme.

It differs from *Dundocoris scholtzi* as discussed under that species.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Mpumalanga**. ♂ holotype: Mariepskop forest, nr. Hoedspruit, Tvl, 24°33′S 30°54′E, 6.x.1981, Liebenberg & Jacobs (TMSA); ♀ allotype: ditto (TMSA); 131 paratypes as follows: 14♂♂ 12♀♀: Same data as holotype (DHJS, TMSA); 1♀: S. Afr., E. Transvaal, Blyderivier Canyon 24°35′S 30°49′E, 5.v.1981, E-Y:1779, sifted litter, bush, leg Endrödy-Younga (TMSA); 4♂♂ 3♀♀: S. Afr., E. Transvaal, Mariepskop, 24°35′S 30°50′E, 5.v.1981, E-Y:1776, sifted cloud forest, leg. Endrödy-Younga. (TMSA); 2♂♂ 1♀: Mariepskop For., Transvaal, viii.1960, Humus (no collector given) (TMSA); 5♂♂ 6♀♀: Blyderivierspoort Nature Reserve, nr. Bourke's Luck, 24°39′S 30°52′E, 28.i.1989, D.H. Jacobs (DHJS, TMSA); 2♂♂ 1♀: ditto, 24°39′S 30°54′E (DHJS); 6♂♂ 8♀♀: Yellow-wood forest, Blyderivierspoort Nature Reserve, 24°40′S 30°54′E, 29.i.1989, D.H. Jacobs (DHJS, TMSA); 10♂♂ 2♀♀: Bridal Veil Falls, nr. Sabie, 25°05′S 30°43′E, 5.xi.1988, D.H. Jacobs (DHJS, TMSA); 2♂♂ 3♀♀: Maritzbos, nr. Sabie, 25°06′S 30°41′E, 6.xi.1988, D.H. Jacobs (DHJS); 1♂: S. Afr. Tvl., Uitsoek, Grootkloof ind. for., 25°15′S 30°33′E, 28.ix.1986; E-Y:2294, intercept. trap 28d, leg. Endrödy-Younga (TMSA); 2♀♀: ditto, 16.xii.1986; E-Y:2395, forest litter before rain (TMSA); 4♂♂ 2♀♀: ditto; 17.xii.1986, E-Y:2396, forest litter after rain (TMSA); 2♂♂ 2♀♀: ditto, 6.ii.1987, E-Y:2425, beating in forest (TMSA); 18♂♂ 14♀♀: S. Afr., E. Transvaal, Berlin F.S., gorge, 25°32′S 30°44′E, 22.ix.1986, E-Y:2284, litter in rock crevices, leg. Endrödy-Younga (TMSA); 1♀: ditto 9.xii.1986, E-Y:2366, intercept trap 56d (TMSA); 1♂: S. Afr., Tvl., Nelshoogte, gallery forest below St., 25°51′S 30°53′E, 2.xii.1986, E-Y:2344, beating, leg. Endrödy-Younga (TMSA). **SWAZILAND**. 1♂ 1♀: Pigs Peak, Humus, x-1961 (TMSA).

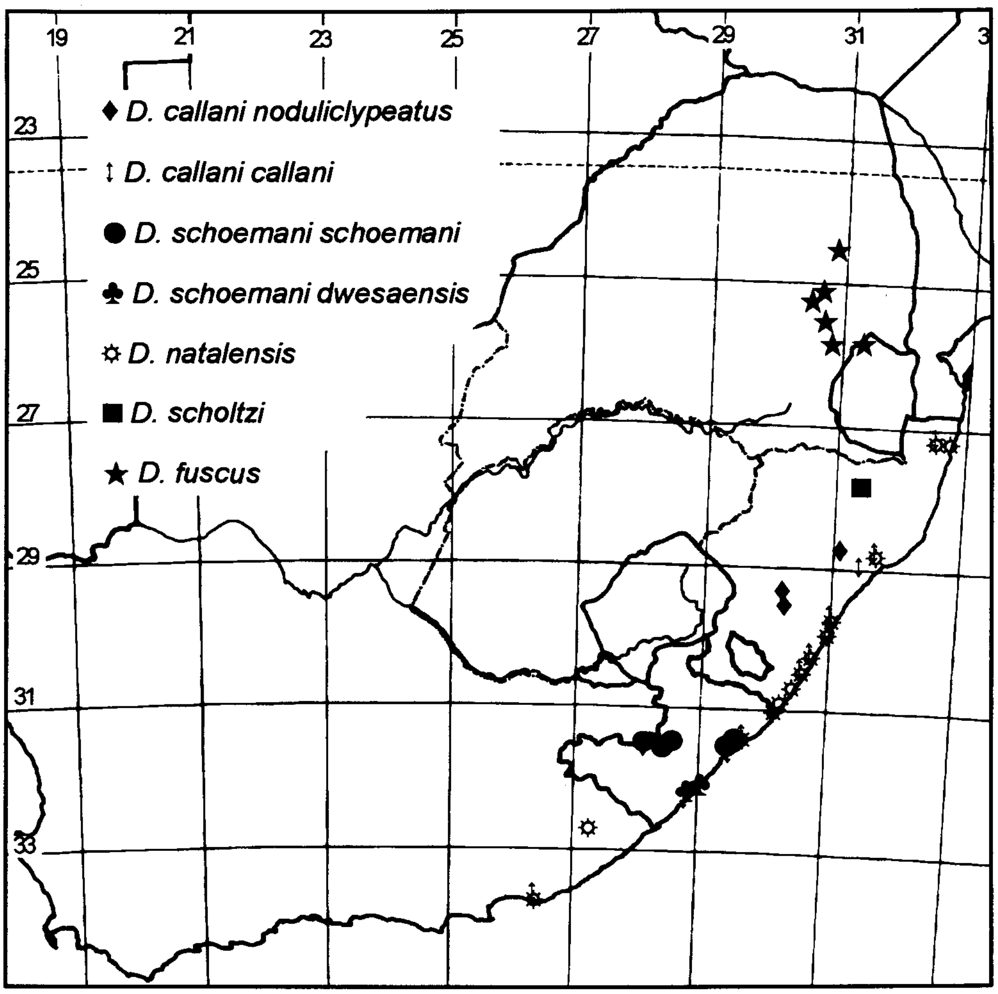


Figure 256. Distribution of *Dundocoris* species and subspecies.

9.1.11 *Dundocoris callani* **Hoberlandt.**, Figs 396-405, 407-425.

D. callani was described in 1959 from a single female collected near Bathurst in the Eastern Cape. It has subsequently proved to be a widespread and common species but also very variable. It is possible that some of populations actually represent separate species but on present information it would be premature to split them up. I was very tempted to describe the population from the Pietermaritzburg area as a separate species as their chromosome number differ and they show some morphological features which set them apart. However, one or two populations in the Eastern Cape seem to be intermediate in some of these morphological characters and I have subsequently decided to allocate only subspecific status to them.

It is the haphazardousness of the variation between the populations that complicates the systematic treatment of this species. It seems that each population has some constant characters that set them apart from adjacent populations but some of these may be shared by geographically distant populations. For example: the specimens from Ngoye forest which is near the northern limit of its distribution area are morphologically much more similar to those from Dwesa which is near the southern limit of its distribution area than both are to the specimens from Umhlanga Rocks in the centre of these locations.

Each population seem to be unique in terms of the combination of characteristics they have, but overall the variation seems to be more or less continuous. An intensive investigation into this species, not based on morphology alone, is needed to elucidate its systematics.

Redescription:

Length: ♂: 3,0 - 3,7 mm; ♀ 3,7 - 4,5 mm.

Width: ♂: 1,4 - 1,9 mm; ♀ 1,8 - 2,4 mm.

Diagnostic measurements are given in Tables 9.16 and 9.17.

Apterous. Male oval, female more ovate. Body coated with a whitish to yellowish incrustation. Heavily incrustate specimens uniformly dark brown, slightly incrustate specimens with thorax lighter than abdomen and checkered pattern on margin of female abdomen prominent, especially in the subspecies *D. callani noduliclypeatus*.

The following description is based on specimens with the incrustation removed.

Head: 1,05 - 1,12x as wide (across eyes) as long (neck not included). Genae straight usually extending beyond clypeus for only a short distance. Antenniferous lobes prominent, usually diverging anteriorly. Postocular lobes variable, prominent and extending beyond level of outer margin of eyes in some populations, nearly absent and obtuse in others. Subapical tubercle on clypeus nearly always absent in the nominate subspecies, present and prominent in *D. callani noduliclypeatus*. Antennae 1,32 - 1,57x as long as width across eyes; length of first segment variable, usually extending beyond apex of genae by distinctly less than half its length, relative lengths of segments about 14:10:16:13, but differing between populations and subspecies.

Thorax: Dorsum. Pronotum about 3,2x as wide as long. Lateral lobes densely granulate, lateral margins slightly concave, anterolateral angles produced anteriorly to level of anterior margin of collar or little beyond, posterolateral angles only slightly produced laterally. Disk irregularly excavated. Transverse ridge behind collar entire or with slight median depression.

Mesonotal median ridge with 2(1+1) longitudinal parallel elevations separated by a prominent median furrow; these elevations may converge and merge at posterior extreme and wedge in between elevations of mesonotal median ridge; elevations longer than length of pronotum excluding collar. Disk with irregular smooth areas and excavations. Lateral lobes densely granulate, lateral margins straight, converging anteriorly. Mesonotum well separated from metanotum by a deep suture except on median ridge where a transverse row of irregular tubercles, which often link up with the posterolateral extremities of the longitudinal elevations, demarcate its posterior margin.

Metanotal median ridge comprising 2(1+1) suboval or subquadrangular elevations separated by a wide furrow with a slight elevation medially which usually reaches posteriorly to the posterior margin of MTg 1 (sometimes even the posterior margin of MTg 2) and anteriorly to the longitudinal elevations of the mesonotal median ridge with which it usually merges. Disk with 2(1+1) irregular smooth areas, often comma-shaped; further with irregular nodules and excavations and a transverse row of nodules along its posterior margin. Lateral lobes densely granulate, lateral margins straight.

MTg 1 usually only moderately elevated relative to metanotum for median half remainder on same level, comprising 2(1+1) transverse ridges, separated medially by a wide furrow; the ridges continues laterally, mainly along the posterior margin, to where it ends at the sublateral elevations to which it is often partially fused, lateral of this a slightly elevated rim at the posterior and lateral margin of MTg 1 may be viewed as a continuation of the ridge. MTg 1 usually totally fused to metanotum but in some populations a weak suture may be present laterally.

MTg 2 subequal or slightly longer than MTg 1, separated laterally by a suture, submedially by the abrupt decline of MTg 1 but medially, at the median furrow, they are usually fused. MTg 2 with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, rest fairly smooth.

Venter and legs: Metasternum usually with a well developed tubercle anterolaterally; just behind the mesocoxa (Fig. 407). Legs as for genus.

Abdomen: Dorsum. Tergal disk about 1,3x as wide as long in males and 1,12x in females, moderately elevated along median line. Carinae separating glabrous impressions usually entire and prominent (except in the Umhlanga Rocks and Stainbank Reserve populations where especially the carina between segment 5/6 is usually broken into nodules), Y-shaped. Dorsal hem present but usually not well developed in females. Posteroexterior angles of DELTg 5-7 slightly but increasingly protruding.

Venter. Ventral hem in females not prominent and hardly discernable in some populations. Spiracle 2 ventral; 3 sublateral, about a spiracle width from lateral margin in males and about 2 spiracle widths in females (on inner margin of ventral hem); 4 sublateral, about half a spiracle width from lateral margin in males and 1½ spiracles widths in females; 5 always lateral and visible from above in males, usually lateral but sometimes slightly removed from margin, but visible from above in females; 6-7 lateral and visible from above; 8 subterminal on paratergites. VELTg 7 of males with elevation like in *D. scholtzi* but much less prominent.

Genitalia: Pygophore as in Figs 400-405, 424-425. Removed parameres as in Figs 408-417, 420-423.

Chromosome number: 2n(♂) = 28XY in nominate subspecies or 26XY in *D. callani noduliclypeatus*.

Habitat and distribution: Widely distributed in coastal and montane evergreen forests in Kwazulu-Natal and the Eastern Cape.

Discussion: *D. callani* is characterised by a combination of its small size, position of spiracle 4 which is never visible from above, the absence of the subapical tubercle on the clypeus in the nominate subspecies and elevations of the mesonotal median ridge which are parallel or convergent posteriorly and may merge and wedge in between elevations of metanotal median ridge.

It is closely related to *D. scholtzi* from which it can be distinguished by its relatively shorter antennal segment 1 (extending beyond apex of genae by at most half its length but usually by distinctly less); spiracle 4 which is never visible from above in both sexes; the median depression on MTg 1 which is usually much wider; the elevation on VELTg 7 of males which is less prominent and the absence of the subapical tubercle on the clypeus in the nominate subspecies.

D. callani is also related to *D. natalensis* from which it can be distinguished as discussed under the latter.

MATERIAL EXAMINED: See under subspecies.

9.1.11.1 *Dundocoris callani callani* Hoberlandt, Figs 396-405, 407-417.

Length: ♂ 3,0 - 3,7 mm; ♀ 3,7 - 4,5 mm.
Width: ♂ 1,4 - 1,8 mm; ♀ 1,8 - 2,3 mm.
Diagnostic measurements are given in Table 9.16.

Table 9.16. Measurements (in mm) of *Dundocoris callani callani* Hoberlandt.

	STRUCTURE		DHLINSA FOREST				UMHLANGA ROCKS			
			N	Mean	SD	Range	N	Mean	SD	Range
MALES	Total	length	10	3.41	0.163	3.14-3.62	10	3.20	0.050	3.07-3.26
		width	10	1.64	0.065	1.52-1.74	10	1.59	0.057	1.48-1.66
	Head	length	10	0.70	0.018	0.67-0.73	10	0.63	0.012	0.61-0.66
		width	10	0.75	0.015	0.72-0.77	10	0.71	0.019	0.68-0.74
	Pronotum	length	10	0.40	0.017	0.37-0.43	10	0.38	0.020	0.35-0.42
		width	10	1.26	0.060	1.15-1.36	10	1.17	0.040	1.10-1.22
	Tergal disk	length	10	0.85	0.032	0.80-0.91	10	0.80	0.021	0.77-0.85
		width	10	1.07	0.052	1.00-1.15	10	1.06	0.036	1.00-1.11
	Antennal segments	I	10	0.30	0.010	0.27-0.31	10	0.26	0.006	0.24-0.27
		II	10	0.21	0.009	0.18-0.23	10	0.18	0.006	0.17-0.20
		III	10	0.33	0.015	0.30-0.36	10	0.29	0.006	0.27-0.30
		IV	10	0.26	0.006	0.25-0.28	10	0.25	0.006	0.24-0.26
			N	Mean	SD	Range	N	Mean	SD	Range
FEMALES	Total	length	10	4.22	0.161	4.03-4.43	10	3.89	0.104	3.70-4.01
		width	10	2.06	0.134	1.81-2.27	10	1.96	0.075	1.81-2.09
	Head	length	10	0.78	0.021	0.75-0.81	10	0.70	0.012	0.68-0.73
		width	10	0.81	0.014	0.79-0.83	10	0.77	0.019	0.74-0.81
	Pronotum	length	10	0.44	0.020	0.40-0.48	10	0.41	0.020	0.37-0.44
		width	10	1.40	0.080	1.31-1.56	10	1.30	0.042	1.21-1.37
	Tergal disk	length	10	1.23	0.061	1.14-1.33	10	1.16	0.032	1.10-1.21
		width	10	1.36	0.064	1.25-1.45	10	1.31	0.058	1.23-1.41
	Antennal segments	I	10	0.31	0.009	0.30-0.33	10	0.27	0.007	0.25-0.29
		II	10	0.22	0.009	0.21-0.25	10	0.19	0.004	0.18-0.20
		III	10	0.35	0.025	0.32-0.39	10	0.30	0.019	0.26-0.35
		IV	10	0.28	0.008	0.26-0.29	10	0.26	0.009	0.24-0.27

Chromosome number: 2n(♂) = 28XY.

Antennae less than 1,5x as long as width across eyes; relative lengths of segments: 14:10:15,8:12,5.

The nominate subspecies can be distinguished from *D. callani noduliclypeatus* by the absence of the subapical tubercle on the clypeus (although it is present in the populations from Nquaba forest and Ku-manina forest), the antenna which is shorter relative to the width of the head (less than 1,5x compared to more than 1,5x), the first antennal segment that surpasses the apex of the genae (on average) with distinctly less than half its length (nearly with half its length in *D. callani noduliclypeatus*), the different relative lengths of the antennal segments (especially segment 4 that is distinctly longer than 2) and the different chromosome number.

Habitat and distribution: Particularly widespread in the coastal forests of Kwazulu-Natal and the Eastern Cape but also present in some montane forests in Kwazulu-Natal and Eastern Cape (Fig. 256).

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. 1♂ 1♀: nr. Manzengwenya, Kwazulu, 27°12'S 32°37'E, 5.xii.1980, D.H. Jacobs (DHJS); 29♂♂ 18♀♀: Ngoye Forest Reserve, nr. Empangeni, 28°50'S 31°43'E, 11-12.xii.1980 D.H. Jacobs (DHJS, TMSA); 3♂♂ 7♀♀: ditto, 22.viii.1985 (DHJS); 47♂♂ 19♀♀: Dhlinsa forest, Eshowe, 28°54'S 31°27'E, 12.iv.1980, D.H. Jacobs (DHJS, TMSA); 7♂♂ 4♀♀: ditto, 21.viii.1985 (DHJS); 19♂♂ 20♀♀: Umhlanga Rocks Nature Reserve, nr. Durban, 29°42'S 31°06'E, 10-11.ix.1991, D.H. Jacobs (DHJS, TMSA); 1♀: nr. Durban, 29°45'S 31°04'E, 8-11.iv.1980, D.H. Jacobs (DHJS); 3♂♂ 5♀♀: Stainbank Nature Reserve, Durban, 29°55'S 30°56'E, 2.xi.1989, D.H. Jacobs, (DHJS, TMSA); 5♂♂ 9♀♀: nr. Scottburgh, 30°15'S 30°46'E, 25.i.1983, D.H. Jacobs (DHJS, TMSA); 2♂♂ 3♀♀: Umdoni Park, nr. Scottburgh, 30°24'S 30°41'E, 27.i.1983, D.H. Jacobs (DHJS). **Eastern Cape**. 1♀: Ntsubane forest, 31°27'S 29°44'E, 25.xi.1987, E-Y: 2537, fungi & for. litter, leg Endrödy-Younga (TMSA); 2♂♂ 3♀♀: Silaka forest Reserve, 31°33'S 29°30'E, 24.xi.1987, E-Y: 2533, indig. forest litter, leg. Endrödy-Younga (TMSA) 3♀♀: Ku-manina forest, nr. Umtata, 31°34'S 28°09'E, 9.xii.1981, D. H. Jacobs (DHJS); 6♂♂ 19♀♀: Nqaba forest, nr. Umtata, 31°36'S 28°07'E, 9.xii.1981, D.H. Jacobs (DHJS, TMSA); 7♂♂ 2♀♀: Mount Thesiger Nature Reserve, Port St. Johns, 31°37'S 29°31'E, 2-6.xii.1981, D.H. Jacobs (DHJS); 13♂♂ 22♀♀: Dwesa forest, 32°18'S 28°50'E, 10-13.xii.1981, D.H. Jacobs (DHJS, TMSA); 2♂♂ 3♀♀: Alexandria forest, nr. Grahamstown, 33°43'S 26°24'E, 30.i.1984, D.H. Jacobs (DHJS, TMSA) 1♂ 2♀♀: Alexandria forest station, 33°43'S 26°23'E, 5.xii.1987, E-Y:2553, groundtraps 2 days, leg Endrödy-Younga (TMSA).

9.1.11.2 *Dundocoris callani noduliclypeatus* subspec. nov., Figs 418-425.

Length: ♂ 3,1 - 3,7 mm; ♀ 3,7 - 4,5 mm.
Width: ♂ 1,5 - 1,9 mm; ♀ 1,8 - 2,4 mm.
Diagnostic measurements are given in Table 9.17.

Table 9.17. Measurements (in mm) of *Dundocoris callani noduliclypeatus* subspec. nov.

STRUCTURE		MALES					FEMALES				
		HT[*]	N[♦]	Mean	SD	Range[$]	AT[#]	N[♦]	Mean	SD	Range[$]
Total	length	3.46	10	3.48	0.116	3.15-3.66	4.10	10	4.11	0.179	3.76-4.47
	width	1.67	10	1.70	0.054	1.55-1.82	2.11	10	2.12	0.094	1.87-2.33
Head	length	0.68	10	0.69	0.030	0.62-0.73	0.76	10	0.74	0.031	0.68-0.79
	width	0.73	10	0.76	0.022	0.71-0.80	0.82	10	0.82	0.029	0.75-0.87
Pronotum	length	0.39	10	0.39	0.019	0.34-0.41	0.44	10	0.42	0.020	0.38-0.49
	width	1.19	10	1.23	0.044	1.09-1.35	1.38	10	1.37	0.046	1.24-1.46
Tergal disk	length	0.88	10	0.87	0.041	0.80-0.96	1.22	10	1.22	0.058	1.11-1.35
	width	1.14	10	1.14	0.042	1.04-1.24	1.36	10	1.41	0.060	1.29-1.52
Antennal segments	I	0.33	10	0.34	0.006	0.31-0.35	0.35	10	0.36	0.009	0.34-0.38
	II	0.23	10	0.24	0.013	0.21-0.27	0.25	10	0.25	0.010	0.23-0.27
	III	0.36	10	0.36	0.018	0.32-0.39	0.39	10	0.38	0.020	0.34-0.42
	IV	0.26	10	0.26	0.011	0.24-0.28	0.28	10	0.27	0.011	0.24-0.29

[*] HT = holotype. [#] AT = allotype.

[$] May include measurements of specimens other than those used for statistical analysis.

[♦] 5♂♂ 5♀♀ from Town Bush and 5♂♂ 5♀♀ from Shaws Wood farm.

Chromosome number: 2n(♂) = 26XY.

Antennae more than 1,5x as long as width across eyes; relative lengths of segments 14:10:15:10,5.

The differences between it and the nominate subspecies have been discussed under the latter.

Habitat and distribution: Montane evergreen forests in Kwazulu-Natal (Fig. 256). A single specimen from Gwaliweni forest in the Ingwavuma district (TMSA) probably also belong to this subspecies but is not included in the type series because of slight morphological differences and the large distance from its known distribution area.

Etymology: Noduliclypeatus referring to the subapical nodule (tubercle) on its clypeus.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ holotype: Town Bush, Pietermaritzburg, 29°33'S 30°20'E, 31.i.1983, D.H. Jacobs (TMSA); ♀ allotype: ditto (TMSA); 663 paratypes as follows: 6♂♂ 6♀♀: Nkandla forest, 28°44'S 31°08'E, 12.iv.1980, D.H. Jacobs (DHJS, TMSA); 8♂♂ 2♀♀: Ehlatini farm, Karkloof, 29°19'S 30°17'E, 1.ii.1983 D.H. Jacobs. (DHJS, TMSA); 77♂♂ 72♀♀: Shaws Wood farm, Karkloof, 29°19'S 30°18'E, 1.ii.1983, D.H. Jacobs (DHJS, TMSA); 311♂♂ 180♀♀: Same data as holotype (DHJS, TMSA); 1♂: Town Bush, Maritzburg District, humus, x.1960 (TMSA).

9.1.12 ***Dundocoris natalensis* Kormilev**, Figs 406, 426-433.

D. natalensis was described from a single male, collected in the Oribi Gorge nr Port Shepstone, mainly in a comparative way to *D. stuckenbergi*.

The holotype, which should be in the Natal Museum, could not be traced. According to Dr. J.G.H. Londt, assistant director of the Natal museum (in litt, 1977) they didn't receive the holotype of *D. natalensis* back from Kormilev. Kormilev (in litt, April 1978), however, claimed that he returned both types of *D. natalensis* and *D. stuckenbergi* in the same parcel. I visited the Natal Museum in 1978 but could find no trace of the holotype.

The mystery intensified when I received a female specimens labelled "Neo-allotype, *Dundocoris natalensis* N. Kormilev 1962" from the Swedish Museum of Natural History. When I informed Kormilev about this find his reply (in litt, June 1978) was: "How *Dundocoris natalensis* came to Sweden? Who made it neo-allotype? It is very strange. Where is original type, do you find it?"

Because *D. natalensis* also shows some haphazard variation over its wide distribution area and it is possible that it is actually a semi-sibling species complex, it is, to my mind, advisable to designate a neotype to avoid future confusion.

The specimen marked neo-allotype of course has no validity as it is not mentioned in the literature and Kormilev himself seems to be unaware of its existence or origin. For the following reasons I shall not designate this specimen as the neotype:

1) It is of another sex as the original holotype.

2) Its collection locality "Natal" is vague and it could have been collected very far away from the original type locality.

3) It is not in very good condition.

I have decided to designate a ♂ specimen from Southport, which is very close to the Oribi Gorge, as the neotype.

It is most peculiar that the distribution area (Fig. 256) of *D. natalensis* is nearly identical to that of *D. callani callani* and that they occur sympatrically in many forests. *D. natalensis*, however, seems to be much rarer than *D. callani*. From the limited number of specimens at hand it appears that a similar type of haphazard variation as in *D. callani* is present in *D. natalensis* and it is also possible that it comprises a species-complex with more than one semi-sibling species.

Redescription:

Length: ♂ 3,4 - 4,2 mm; ♀ 4,0 - 5,0 mm.
Width: ♂ 1,6 - 2,0 mm; ♀ 2,0 - 2,4 mm.
Diagnostic measurements are given in Table 9.18.

Table 9.18. Measurements (in mm) of *Dundocoris natalensis* Kormilev.

STRUCTURE		MALES					FEMALES				
		NT*	N◆	Mean	SD	Range	NAT#	N◆	Mean	SD	Range
Total	length	4.05	10	3.758	0.243	3.46-4.12	4.50	10	4.39	0.287	4.02-4.91
	width	1.84	10	1.78	0.103	1.67-1.97	2.16	10	2.21	0.122	2.07-2.40
Head	length	0.75	10	0.71	0.039	0.64-0.78	0.76	10	0.76	0.033	0.70-0.80
	width	0.78	10	0.74	0.036	0.70-0.81	0.80	10	0.78	0.035	0.74-0.84
Pronotum	length	0.50	10	0.44	0.040	0.38-0.51	0.46	10	0.46	0.032	0.42-0.52
	width	1.36	10	1.30	0.078	1.20-1.44	1.45	10	1.42	0.072	1.30-1.53
Tergal disk	length	1.01	10	0.94	0.059	0.87-1.04	1.34	10	1.31	0.099	1.18-1.51
	width	1.24	10	1.20	0.075	1.13-1.35	1.51	10	1.48	0.093	1.37-1.65
Antennal segments	I	0.33	10	0.33	0.011	0.31-0.35	0.35	10	0.35	0.017	0.31-0.38
	II	0.23	10	0.23	0.012	0.20-0.25	0.24	10	0.24	0.013	0.22-0.27
	III	0.44	10	0.41	0.026	0.37-0.45	0.45	10	0.43	0.022	0.40-0.47
	IV	0.27	10	0.26	0.013	0.25-0.30	0.29	10	0.27	0.013	0.25-0.30

*** NT = neotype. # NAT = neo-allotype.**

◆ 3♂♂ 3♀♀ from Umtamvuma forest, 2♂♂ from Umdoni Park, 1♂ 2♀♀ from Stainbank Nature Reserve, 2♂♂ 1♀ from Ngoye forest, 1♂ from Mtwalume, 1♂ from Lake Bhangazi, 1♀ from Ramsgate,1♀ from Durban, 1♀ from South Port, 1♀ from Scottburgh and 1♀ from "Natal" (labelled neo-allotype - Riksmuseum Stockholm).

Apterous. Body oval, coated with a greyish-brown incrustation. Heavily incrustate specimens uniformly dark brown, slightly incrustate specimens greyish brown with thorax slightly lighter coloured than abdomen. Checkered pattern on margin of female abdomen discernable but not prominent. The following description is based on specimens with the incrustation removed.

Head: About 1,05x as wide (across eyes) as long (neck not included). Genae straight, usually extending beyond clypeus for only a short distance. Antenniferous lobes prominent, usually slightly diverging anteriorly. Postocular lobes variable, usually not extending beyond level of outer margins of eyes. Subapical tubercle on clypeus present and usually prominent. Antennae about 1,65x as long as width across eyes; extending beyond apex of genae by little less than half its length; relative lengths of segments 14,5:10:18:11,5.

Thorax: Dorsum. Pronotum about 3,0x as wide as long. Lateral lobes granulate, lateral margins slightly concave, anterolateral angles produced anteriorly beyond level of anterior margin of collar, posterolateral angles only slightly produced laterally. Disk smooth submedially, further with irregular excavations. Transverse ridges behind collar with prominent median depression.

Mesonotal median ridge with 2(1+1) longitudinal elevations separated by a prominent median furrow; these elevations usually diverge posteriad, sometimes forming a slight curve and often widening posteriorly; never converging or merging at posterior extreme; elevations shorter than length of pronotum excluding collar. Disk usually smooth anteriorly, medially and laterally; with some irregular nodules on posterior margin (which may link up with posterolateral extremity of the elevations of median ridge) and in central area. Lateral lobes granulate with lateral margins straight, converging anteriorly. Mesonotum well separated from metanotum by a deep suture except on median ridge where the irregular nodules usually demarcate it.

Metanotal median ridge comprising 2(1+1) suboval elevations separated by a wide furrow. Disk with 2(1+1) large, more or less comma-shaped, smooth areas anteriorly; laterally nodulated and also with row of nodules on its posterior margin which often link up with elevations on median ridge. Lateral lobes granulate, lateral margins straight.

MTg 1 very moderately elevated relative to metanotum for median two thirds, remainder on lower level; comprising 2(1+1) transverse ridges on posterior margin between submedian and sublateral longitudinal elevations; submedian elevations separated by wide furrow; area lateral of sublateral elevations smooth. MTg 1 usually totally fused to metanotum but a weak suture may be present laterally.

MTg 2 subequal in length to MTg 1, laterally separated from it by a suture, submedially by the abrupt decline of MTg 1 but fused at median furrow; with 2(1+1) submedian and 2(1+1) sublateral longitudinal ridges, rest very smooth.

Venter and legs: Metasternum without a tubercle behind the mesocoxa (Fig. 406). Legs as for genus.

Abdomen: Dorsum. Tergal disk about 1,27x as wide as long in males and 1,13x in females, moderately elevated along median line. Carinae separating glabrous impressions entire and prominent, Y-shaped, not reaching lateral margin of tergal disk. Area between carinae and glabrous impressions very smooth (more so than in *D. callani*). Dorsal hem in females well developed. Posteroexterior angles of DELTg 5-7 only slightly protruding.

Venter. Ventral hem in females usually clearly discernable. Spiracle 2 ventral; 3-4 sublateral, 3 about 1½ spiracle widths from lateral margin and 4 about 1 spiracle width in males, both about 1½ spiracle widths from lateral margin, just mesally from ventral hem, in females; 5-7 lateral and visible from above; 8 subterminal on paratergites. Elevation on VELTg 7 of males not prominent.

Genitalia: Pygophore as in Figs 432-433. Removed parameres as in Figs 428-431.

Chromosome number: 2n(♂) = 28XY.

Habitat and distribution: They occur mainly in coastal evergreen forests in Kwazulu-Natal and the Eastern Cape (Fig. 256).

Discussion: *D. natalensis* is characterised by a combination of its short, usually posteriorly diverging elevations of the mesonotal median ridge, sublateral position of spiracle 4 (which is never visible from above) and the presence of the subapical tubercle on the clypeus.

It is slightly larger (on average) than *D. callani* and can be distinguished from it by the elevations of mesonotal median ridge which are shorter than the length of the pronotum behind the collar and usually diverge, the absence of the tubercle anterolaterally on the metasternum, the antennae which are more than 1,6x as long as the width across the eyes. From the nominate subspecies of *D. callani* (with which it occurs sympatrically) it can also be distinguished by the presence of the subapical tubercle on the clypeus.

In general facies *D. natalensis* is also very similar to *D. nodulicarinus* with which it occurs sympatrically but it can easily be distinguished by the unbroken carinae on the tergal disk.

MATERIAL EXAMINED: **SOUTH AFRICA**. **Kwazulu-Natal**. ♂ neotype: nr. Southport, 30°40′S 30°30′E, 29.i.1983 D.H. Jacobs (TMSA); 1♂ 1♀: nr. Manzengwenya, Kwazulu, 27°12′S 32°37′E, 5.xii.1980, D.H. Jacobs (DHJS); 1♀: Manzengwenya, 27°13′S 32°47′E, 7.xii.1980, D.H. Jacobs (DHJS); 1♂: Ngoye forest Reserve, nr. Empangeni, 28°50′S 31°43′E, 11-12.xii.1980, D.H. Jacobs (DHJS); 1♂ 1♀: ditto, 22.vii.1985 (DHJS, TMSA); 1♂: Hawaan forest, nr. Umhlanga Rocks, 29°42′S 30°05′E, 26.i.1983, D.H. Jacobs (DHJS); 1♀: nr. Durban, 29°45′S 31°04′E, 8-11.iv.1980, D.H. Jacobs (TMSA); 1♂ 2♀♀: Stainbank Nature Reserve, Durban, 29°55′S 30°56′E, 2.xi.1989, D.H. Jacobs (DHJS, TMSA); 1♀: nr. Scottburgh, 30°15′S 30°46′E, 25.i.1983, D.H. Jacobs (TMSA); 2♀♀: Umdoni Park, nr. Scottburgh, 30°24′S 30°41′E, 23.i.1983, D.H. Jacobs (DHJS, TMSA); 1♂ 1♀: nr. Mtwalume, 30°29′S 30°37′E, 29.i.1983, D.H. Jacobs (DHJS); 1♂ 1♀: Same data as neotype (TMSA); 1♀: nr. Ramsgate, 30°55′S 30°19′E, 28.i.1983, D.H. Jacobs (DHJS); 3♂♂ 3♀♀: Umtamvuma forest, nr. Port Edward, 31°03′S 30°11′E, 28.i.1983, D.H. Jacobs (DHJS, TMSA). **Eastern Cape**. 1♂ 1♀: Ntsubane forest, 31°27′S 29°44′E, 25.xi.1987, E-Y:2537 fungi + forest litter, leg. Endrödy-Younga (TMSA); 1♂: Amatole, Pirie Forest, 32°43′S 27°17′E, 8.xii.1987, E-Y:2560, indig. forest litter, leg. Endrödy-Younga (TMSA); 1♂ 1♀: Alexandria forest, nr. Grahamstown, 33°43′S 26°24′E, 30.i.1984, D.H. Jacobs, (DHJS); 5♂♂: ditto, 33°43′S 26°23′E, 4.xii.1987, E-Y:2550; forest litter, leg. Endrödy-Younga (TMSA).

9.2 Cytogenetics of the genus *Dundocoris*

The localities and number of individuals of *Dundocoris* taxa that were cytogenetically studied are presented in Table 9.19. The course of meiosis in all *Dundocoris* species is of the normal Carventine type (similar to that of *Adamanotus uncotibialis*).

Table 9.19. Locality and numbers of individuals of *Dundocoris* species cytogenetically studied

Locality	Co-ordinates	Date collected	No. of individuals cytogenetically studied
Dundocoris nodulicarinus nodulicarinus			
Mpesheni forest, nr. Kokstad	30°38′S 29°40′E	30/xi/1981	3
Lesser Stinkwood forest	30°33′S 29°43′E	29/xi/1981	1
Dundocoris nodulicarinus novenus			
Isidenge forest, nr. Stutterheim	32°40′S 27°17′E	14-17/xii/1981	15
ditto	"	26-31/i/1984	4 + 7 embryos
Qacu Forest Reserve, nr.Stutterheim	32°25′S 27°18′E	17/xii/1981	4
Schwarzwald forest, nr. Hogsback	32°39′S 27°00′E	16/xii/1981	1
Dundocoris nodulicarinus septeni			
Alexandria forest, nr. Grahamstown	33°43′S 26°24′E	18/xii/1981	1
ditto	"	30/i/1984	8 + 1 female

Locality	Co-ordinates	Date collected	No. of individuals cytogenetically studied
Dundocoris marieps			
Mariepskop forest, nr. Hoedspruit	24°33'S 30°54'E	4/x/1981	13
Dundocoris begemanni			
nr. Injasuti, Giants Castle Reserve	29°06'S 29°29'E	3/ii/1983	5
Dundocoris stuckenbergi stuckenbergi			
Town Bush, Pietermaritzburg	29°33'S 30°20'E	31/i/1983	6
Shaws Wood farm, Karkloof	29°19'S 30°18'E	31/i/1983	1
Dundocoris stuckenbergi ngomensis			
Ngome forest station, nr. Louwsburg	27°49'S 31°25'E	20-24/i/1983	17
Dundocoris nigromaculatus			
Ngoye forest reserve, nr Empangeni	28°50'S 31°43'E	11-12/xii/1980	16
Dhlinza forest, Eshowe	24°54'S 31°27'E	21/viii/1985	2
Dundocoris flavilineatus flavilineatus			
Dhlinza forest, Eshowe,	24°54'S 31°27'E	12/iv/1980	1
nr. Durban	29°45'S 31°04'E	4/iv/1980	2
Shaws Wood farm, Karkloof	29°19'S 30°18'E	1/ii/1983	3
Lesser Stinkwood forest, nr. Kokstad	30°33'S 29°43'E	29/xi/1981	2
nr. Manzengwenya, Kwazulu	27°18'S 32°45'E	6/xii/1980	6
Manzengwenya, Kwazulu	27°16'S 32°46'E	3-7/xii/1980	3
nr. Maphelana, Kwazulu-Natal	28°26'S 32°25'E	10/xii/1980	3
Mpsheni forest nr. Kokstad	30°38'S 29°40'E	30/xi/1981	3
Ngoye forest reserve, nr Empangeni	28°50'S 31°43'E	11-12/xii/1980	8
nr. Scottburgh	30°15'S 30°46'E	25/i/1983	6
Sordwana Bay, Kwazulu-Natal	27°32'S 32°40'E	23/vii/1977	1
Dundocoris flavilineatus ndabeniensis			
Ndabeni forest, nr. Josini	27°22'S 32°00'E	24/i/1983	3
Dundocoris schoemani schoemani			
Baziya forest, nr. Umtata	31°34'S 28°25'E	8-9/xii/1981	6
Kambi Forest Reserve, nr. Umtata	31°28'S 28°36'E	8/xii/1981	7
Ku-manina forest, nr. Umtata	31°34'S 28°09'E	9/xii/1981	6
Nquaba forest, nr. Umtata	31°36'S 28°07'E	9/xii/1981	3
Dundocoris schoemani dwesaensis			
Dwesa forest Eastern Cape	32°18'S 28°50'E	10-13/xii/1981	5
Dundocoris scholtzi			
Ngome forest station, nr. Louwsburg	27°49'S 31°25'E	20-24/i/1983	16
Dundocoris fuscus			
Mariepskop forest, nr. Hoedspruit	24°33'S 30°54'E	6/x/1981	5
Dundocoris callani callani			
Dwesa forest	32°18'S 28°50'E	10-13/xii/1981	7
nr. Durban	29°45'S 31°04'E	8-11/iv/1980	1
Alexandria forest, nr. Grahamstown	33°43'S 26°24'E	30/i/1984	5
Ngoye Forest Reserve, nr. Empangeni	28°50'S 31°43'E	11-12/xii/1980	7
Nqaba forest, nr. Umtata	31°36'S 28°07'E	9/xii/1981	5
Mount Thesiger Nature Reserve, Port St. Johns	31°37'S 29°31'E	2-6/xii/1981	8
nr. Scottburgh	30°15'S 30°46'E	25/i/1983	4
Umdoni Park, nr. Scottburgh	30°24'S 30°41'E	27/i/1983	1
Dundocoris callani noduliclypeatus			
Town Bush, Pietermaritzburg	29°33'S 30°20'E	31/i/1983	10
Shaws Wood farm, Karkloof	29°19'S 30°18'E	1/ii/1983	7

Locality	**Co-ordinates**	**Date collected**	**No. of individuals cytogenetically studied**
Dundocoris natalensis			
Alexandria forest, nr. Grahamstown	**33°43'S 26°24'E**	**30/i/1984**	**4**
Manzengwenya	**27°13'S 32°47'E**	**7/xii/1980**	**1**
Ngoye forest Reserve, nr. Empangeni	**28°50'S 31°43'E**	**11-12/xii/1980**	**2**
Umtamvuma forest, nr. Port Edward	**31°03'S 30°11'E**	**28/i/1983**	**3**
Umdoni Park, nr. Scottburgh	**30°24'S 30°41'E**	**23/i/1983**	**3**
Hawaan forest, nr. Umhlanga Rocks	**29°42'S 30°05'E**	**26/i/1983**	**3**

9.2.1 *Dundocoris nodulicarinus* (Figs 257-259, 434-459)

This is a very interesting taxon from a cytogenetic viewpoint. It contains three subspecies which are morphologically indistinguishable but have different chromosome numbers. Furthermore two of the subspecies exhibit a multiple XY_1Y_2 sex chromosome system while the other one has a normal XY sex chromosome system. *D. nodulicarinus septeni* also features the unique situation where both the original X and Y chromosomes were involved in fusions with autosomes.

9.2.1.1 *Dundocoris nodulicarinus nodulicarinus* (Figs 257, 452-453)

The chromosome number of *Dundocoris nodulicarinus nodulicarinus* is 2n(♂) = 14XY. The true and relative chromosome areas for *D. nodulicarinus nodulicarinus* are represented in Table 9.20 and an idiogram in Fig. 257. Although 14XY is probably the ancestral chromosome number of the Aradidae, the karyotype of *D. nodulicarinus nodulicarinus* does not reflect the ancestral karyotype but a highly derived one. Three of the six autosomes are distinctly larger than the other three (in the ancestral karyotype it is presumed that the autosomes form a more or less gradual size series as it is present in *Silvacoris heissi*, *S. pondolandensis*, *Calisius africanus* and a *Brachyrhynchus* species). As most other *Dundocoris* taxa have chromosome numbers of 26XY or 28XY and there are strong indications that 28XY is the ancestral number for *Dundocoris* it seems that *D. nodulicarinus nodulicarinus* originated from a 28XY ancestor by means of at least 7 autosomal fusions. The three large chromosomes each probably consist of at least three of the original chromosomes while the fourth largest chromosome probably originated by the fusion of two of the smallest original chromosomes.

Table 9.20. True and relative chromosome areas of *D. nodulicarinus nodulicarinus*.

True chromosome areas (µm²) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Mpesheni forest**	**Mpesheni forest**
Individuals	**1**	**1**
Cells	**6**	**6**
A1	**5.50(±1.00)**	**25.16(±0.73)**
A2	**5.17(±0.91)**	**23.68(±0.62)**
A3	**4.92(±0.81)**	**22.59(±0.48)**
A4	**2.39(±0.37)**	**10.99(±0.55)**
A5	**1.96(±0.33)**	**8.99(±0.40)**
A6	**1.88(±0.34)**	**8.60(±0.45)**
X	**5.35(±1.22)**	**24.37(±2.78)**
Y	**4.96(±1.08)**	**22.67(±2.66)**
Autosomes	**21.83(±3.68)**	
All chromosomes	**32.14(±5.76)**	

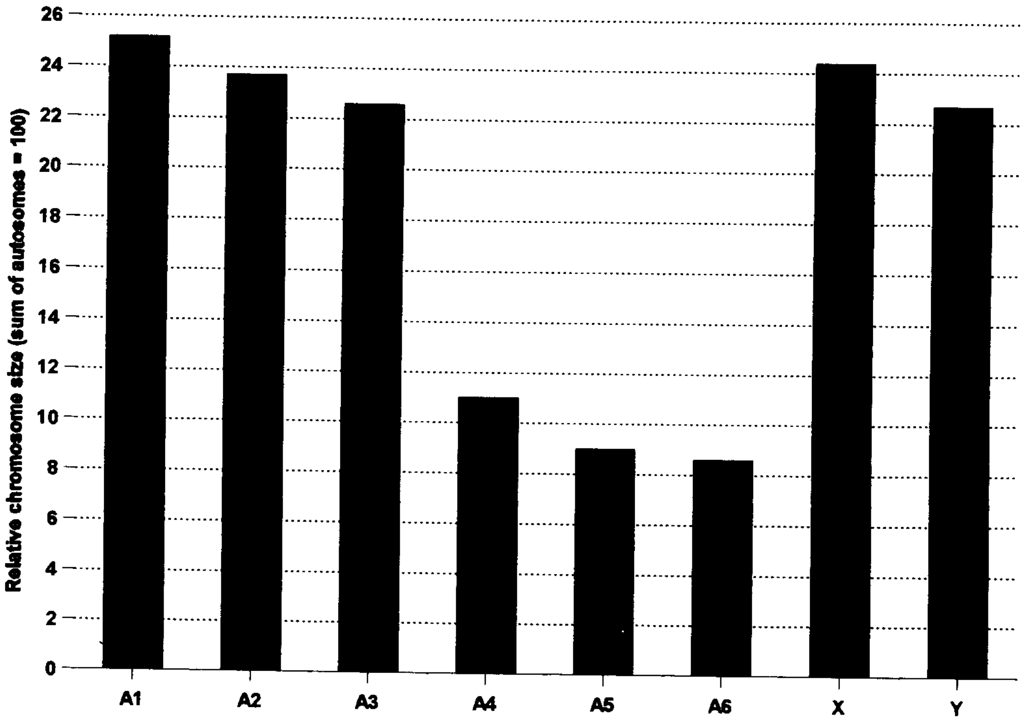


Figure 257. Idiogram of *Dundocoris nodulicarinus nodulicarinus*.

9.2.1.2 *Dundocoris nodulicarinus novenus* (Figs 258, 434-451)

The chromosome number of *Dundocoris nodulicarinus novenus* is $9XY_1Y_2$ (where Y_1 represents a neo-Y and X a neo-X which originated by the fusion of an autosome with the X-chromosome). The true and relative chromosome areas for *D. nodulicarinus novenus* are presented in Table 9.21 and an idiogram in Fig. 258. The karyotype consists of one very large autosome, two small autosomes, a large neo-X chromosome (the result of a fusion between an autosome and the original X-chromosome), the neo-Y chromosome (indicated by Y_1) which represents the homologue of the autosome involved in the autosome-X fusion and the original Y-chromosome (indicated by Y_2).

Table 9.21. True and relative chromosome areas of *D. nodulicarinus novenus*.

True chromosome areas (µm²) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.	Relative chromosome areas (% of total area of all chromosomes) and standard deviation.
Chromosome	Isidenge forest	Isidenge forest	Isidenge forest
Individuals	3	3	3
Cells	9	9	9
A1	12.24(±2.31)	72.92(±1.85)	32.02(±0.93)
A2	2.51(±0.47)	14.98(±1.29)	6.58(±0.58)
A3	2.02(±0.33)	12.10(±0.87)	5.31(±0.37)
X	10.31(±1.93)	61.46(±1.80)	26.97(±0.81)
Y_1	6.24(±1.13)	37.25(±1.47)	16.34(±0.46)
Y_2	4.87(±0.87)	29.11(±1.94)	12.77(±0.77)
Autosomes	16.77(±3.03)		
All chromosomes	38.19(±6.86)		

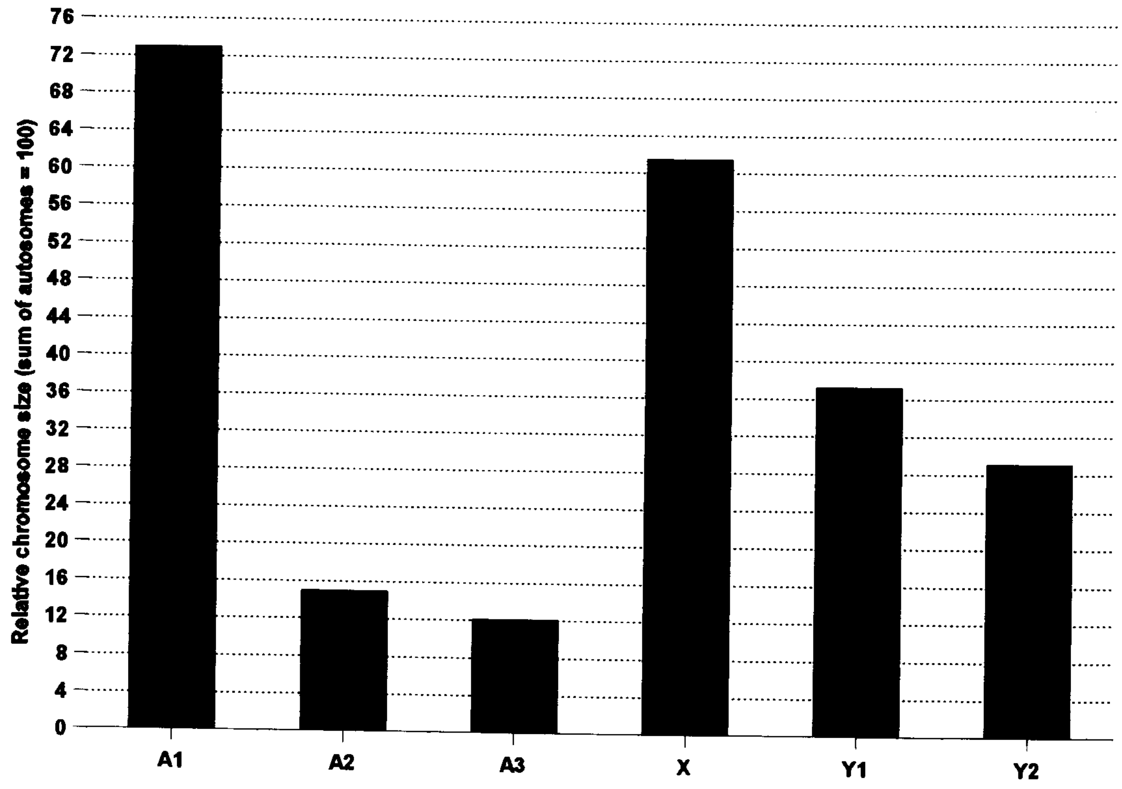


Figure 258. Idiogram of *Dundocoris nodulicarinus novenus*.

D. nodulicarinus novenus presumably originated from *D. nodulicarinus nodulicarinus* by means of three fusions namely (not necessarily in the indicated order):

1. Fusion between one of the small and one of the large autosomes.
2. Fusion between two of the large autosomes.
3. Fusion between one of the large autosomes and the X-chromosome.

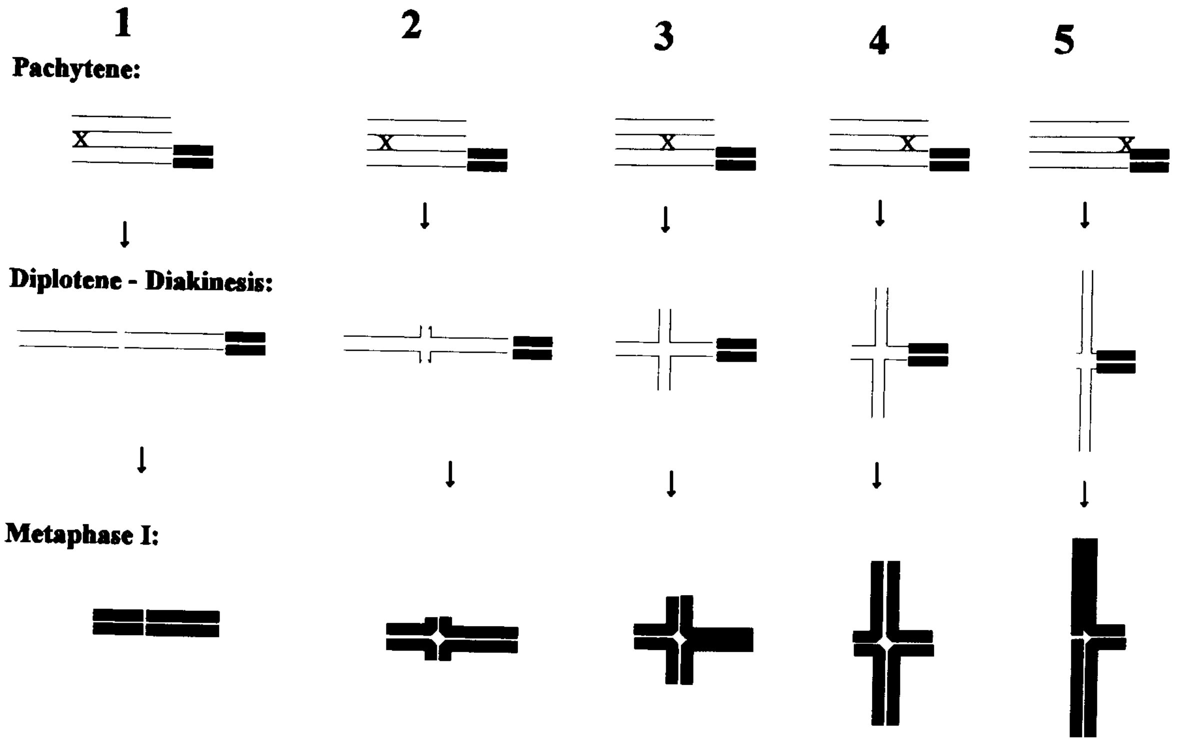
The behaviour of the neo-XY chromosome structure during meiosis is of particular interest because, in the Heteroptera, the sex chromosomes are positively heterochromatic during prophase I and undergo chromatid segregation at AI while the autosomes are euchromatic and exhibit normal crossovers and segregation

During Leptotene-Pachytene the original sex chromosomes are heterochromatic and associated to form a single circular body with the individual chromosomes not discernable while all the autosomes and the autosomal part of the neo-X are euchromatic and form the usual pachytene strands (Fig. 434). A very lightly stained nucleolus, which is at least the size of the heterochromatic body, is usually associated with it.

During the diffuse stage all the autosomes and the autosomal part of the neo-X become fuzzy and the chromatids are not discernable. The original sex chromosomes stay positively heterochromatic and associated and form a smooth, circular body (Fig. 453). The lightly stained round nucleolus is still visible and associated with this body.

During diplotene-diakinesis the individual bivalents become visible and the individual chromatids become discernable so that the chiasmata are clearly visible in the large autosomal bivalent and the neo-XY structure. The two small autosomal bivalents usually form two quadripartite structures where the four chromatids are loosely connected by thin strands (Figs 436-438). The original sex chromosomes are still positively heterochromatic but become detached from each other. The original X-chromosome is often some distance apart from its fused autosomal part and only connected to it by a very thin strand (Figs 436-437). At late diakinesis this strand becomes more visible and the heterochromatic X part of the neo-X moves closer to its autosomal part.

During diplotene-diakinesis the neo-XY shows one chiasma without exception and the structure of the 'bivalent' depends on where the crossing over took place as follows:



Forty diakinese cells were scored for types 1-5 structures (as defined in the figure above) for the neo-XY 'bivalent' and their percentages are as follows:

TYPE	1	2	3	4	5
PERCENTAGE	32.5	27.5	27.5	5	7.5

It is clear that the most crossovers are located in the distal part of the 'bivalent' (as defined relative to the position of the original X). The same cells were scored for the chiasmata of the large autosomal bivalent with the following results:

BIVALENT TYPE	2/0	2/1	2/2	1/0	1/1
PERCENTAGE	45	37.5	7.5	7.5	2.5

At metaphase I the autosomes and the original sex chromosomes become isochromatic. Five structures are visible namely the three autosomal bivalents, the neo-XY 'bivalent' and the original Y-chromosome (= Y_2). The original X and the autosomal part of the neo-X form an unbroken unit and the fusion site is not discernable. In the type 1 neo-XY structures a small gap indicates the terminalized chiasma (Figs 439-440). The large autosome is usually visible as a more or less solid roundish structure where it is difficult to determine the exact position of the chiasmata, especially if both chiasmata are not terminalized. Where both chiasmata are terminalized (2/2) it forms the usual donut-shaped structure. In the cases where only one chiasma is present it usually occurs interstitially (Fig. 440). In the 1/0 large autosomal bivalent in Fig. 443 crossing over has occurred near one end and the bivalent has orientated with its long axis parallel to the equatorial plate. This is not always the case and it often orientates with its long axis perpendicular to the equatorial plate - it seems that this depends on at which telomere the spindle fibres have attached. In *Triatoma infestans* Pérez et al. (1997) have shown that the chromosome ends may show kinetic activity independent of the chiasma position and it is also probably the case here. The small autosomal bivalents usually form a square or rectangular structure and their quadripartite structure is usually still visible.

Forty-five metaphase cells were scored for the five types of the neo-XY 'bivalent' with the following results:

TYPE	1	2	3	4	5
PERCENTAGE	42	18	33	2	4

The results are similar to that of diakinesis and again indicate the distal localisation of the crossovers. It also demonstrates that there is not terminalization of chiasmata.

The large autosomal bivalent shows the following percentages of chiasmatic types:

BIVALENT TYPE	2/0	2/1	2/2	1/0	1/1
PERCENTAGE	53	31	9	7	0

Again it is very similar to the results for diakinesis, arguing against terminalization of chiasmata.

During anaphase I five structures move to each pole, namely the three autosomes, one chromatid of the original Y-chromosome (Y_2) and one chromatid of the neo-X together with a chromatid of the neo-Y (Y_1) (Figs 444-446). The chromosomes of the large autosomal bivalent often move to the poles with their long axes perpendicular to the spindle axis, indicating that the spindle has probably attached to more than one point along the chromosome (Figs 444, 446), but this is not always the case and sometimes it is clearly attached to one of the chromosome ends as is usual for the Heteroptera (refer to the discussion at 9.2.1.4).

Metaphase II (Figs 447-448) follows directly after AI and four structures are present at this stage, namely the three autosomes and the tripartite sex chromosome structure which consist of the neo-X on the one side and the neo-Y (Y_1) and original Y (Y_2) on the other side. The latter undergo the usual touch-and-go pairing with the original X part of the neo-X. It is interesting to note that the large autosome usually lies with its long axis parallel to the equatorial plate and it often seems if there is bi-telomeric attachment of the spindle fibres resulting in each chromatid forming a C-shaped structure (Fig. 448).

At anaphase II four chromatids (= daughter chromosomes) (two large and two small, representing the large autosome, large neo-X and two small autosomes) segregate to one pole and five (one large, two medium and two small, representing the large autosome, medium sized neo-Y and original Y and the two small autosomes) to the opposite pole. No early AII cells were found (indicating the short duration of this stage), but from late AII cells it looks possible that the larger chromosomes move broadside to the poles.

Spermatogonial mitosis (Fig. 450) clearly shows 9 chromosomes (two large autosomes, four small autosomes, large neo-X and medium sized neo-Y and Y-chromosomes) while oogonial mitosis (Fig. 451) shows 8 chromosomes (two large autosomes, four small autosomes and two large neo-X chromosomes).

9.2.1.3. *Dundocoris nodulicarinus septeni.* (Figs 259, 454-459).

The chromosome number of *Dundocoris nodulicarinus septeni* is 2n(♂) = $7XY_1Y_2$ (where Y_1 represents the neo-Y that originated by the fusion of an autosome with the X-chromosome - like in *D. nodulicarinus novenus*; Y_2 represent a neo-Y that originated by the fusion of an autosome to the Y-chromosome; X represent a neo-X comprising the original X which has fused to a large autosome (like in *D. nodulicarinus novenus*) on the one side and to a small autosome - the homologue of the autosome that fused with the Y-chromosome - on the other side).

The true and relative chromosome areas of *D. nodulicarinus septeni* are presented in Table 9.22 and an idiogram in Fig. 259.

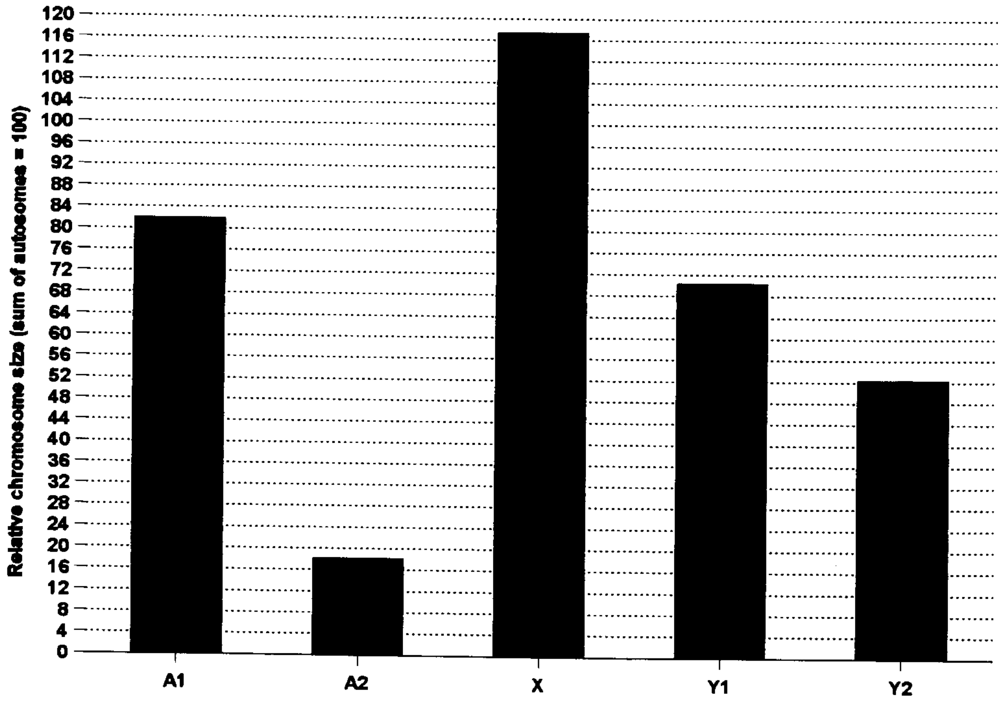


Figure 259. Idiogram of *Dundocoris nodulicarinus septeni*.

Table 9.22. True and relative chromosome areas of *D. nodulicarinus septeni*.

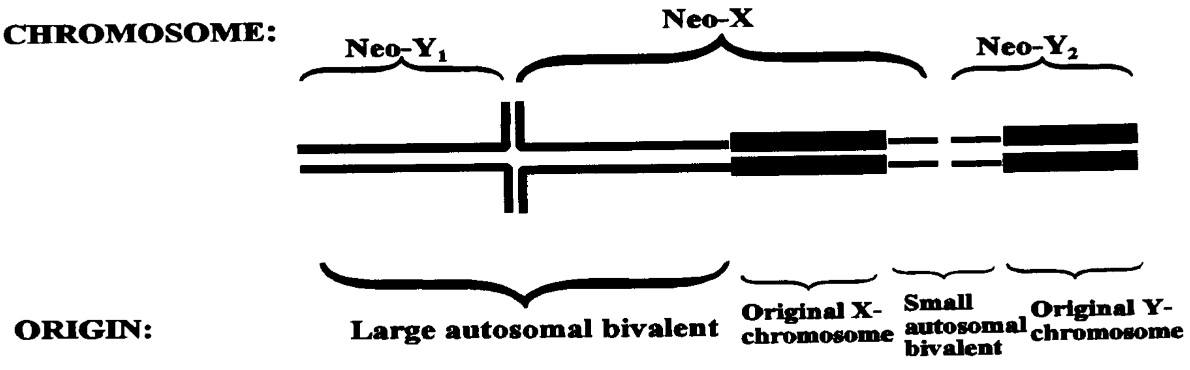
True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.	Relative chromosome areas (% of total area of all chromosomes) and standard deviation.
Chromosome	Alexandria forest	Alexandria forest	Alexandria forest
Individuals	3	3	3
Cells	8	8	8
A1	9.12(±1.61)	81.94(±2.28)	24.13(±1.18)
A2	1.99(±0.24)	18.06(±2.28)	5.31(±0.58)
X	13.00(±1.93)	117.28(±3.14)	34.49(±0.18)
Y_1	7.82(±1.31)	70.39(±1.94)	20.70(±0.45)
Y_2	5.77(±0.64)	52.36(±4.41)	15.38(±0.96)
Autosomes	11.11(±1.75)		
All chromosomes	37.70(±5.55)		

The karyotype consists of one large autosome, one small autosome and the three neo sex chromosomes as described above. *D. nodulicarinus septeni* possibly originated from *D. nodulicarinus novenus* by means of two fusions namely:

1. Fusion between one of the small autosomes and the original Y-chromosome.
2. Fusion between the homologue of the same small autosome and the neo-X of *D. nodulicarinus novenus*.

The two homologues of one small autosome have thus been involved in fusions with the original X and Y chromosomes respectively.

The course of meiosis is basically similar to that of *D. nodulicarinus novenus* and mainly differences are pointed out in the following description. During diakinesis and MI only three structures are present namely the two autosomes and the composite sex chromosome structure consisting of the neo-X and both the neo-Y chromosomes. The composition and origin of this structure are schematically presented as follows:



During diplotene-diakinesis the two original sex chromosomes that form the positively heterochromatic structure, become separated. The original X part of the neo-X usually lies, from the time the chromosomes become discernable, close to its autosomal part and neo-Y_1 while the neo-Y_2 (which embodies the original Y) usually lies well removed from this structure and is only connected to it with two very thin, nearly invisible strands. At late diakinesis it is apparent that this gap is situated between the two parts of the small autosomal 'bivalent' and represents a terminal chiasma. (This is equivalent to the situation in *D. nodulicarinus novenus* where there is usually a gap between the two chromosomes of the small autosomal bivalents.) During metaphase I the neo-Y_2 moves closer to the neo-X but a small gap always remains visible. The two strands that attach them, however, become clearly detectable. The two chromatids of the original Y-chromosome usually lie somewhat directed towards the poles with its free end, suggesting spindle attachment to them.

The crossover pattern of both the large autosomal bivalent and the neo-Y_1 - neo-X 'bivalent' differs markedly from that of *D. nodulicarinus novenus*. The large autosomal bivalent exhibits the following percentages of chiasmatic types (37 MI cells were analysed):

BIVALENT TYPE	2/0	2/1	2/2	1/0	1/1
PERCENTAGE	3	24	73	0	0

Although no 1/0 or 1/1 chiasmic types were observed they probably occur in a very low frequency.

The neo-X - neo-Y part of the sex chromosome structure was also scored for the five types of single crossovers as defined for *D. nodulicarinus novenus*. In addition to the five types a substantial number of them have two crossovers. The observed percentages for the 37 analysed MI cells are as follows:

TYPE	1	2	3	4	5	2 chiasmata
PERCENTAGE	11	5	30	5	3	46

The neo-Y_1 - neo-X 'bivalent' with two chiasmata have interesting complications for segregation as discussed in 9.2.1.4.

During AI three bodies move to each pole namely the two autosomes and the tripartite neo-X-neo-Y_1-neo-Y_2 (one chromatid of each of the latter). Although no early AI cells were observed, late AI cells often suggest the broadside movement of the larger chromosomes.

At MII (Fig. 457) three structures are present namely the two autosomes and the tripartite sex chromosome structure which incorporates the neo-X on the one side and the neo-Y_1 and neo-Y_2 on the other. Both the large autosome and the neo-X lie with their long axis parallel to the equatorial plate. At AII four daughter chromosomes (the large autosome, the small autosome and the medium sized neo-Y_1 and Y_2) segregate to one pole and three (the large autosome, the small autosome and the large neo-X) to the opposite pole.

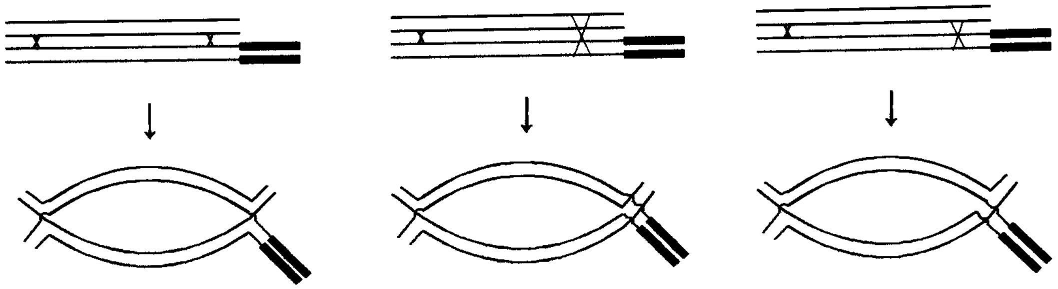
Spermatogonial mitosis (Fig. 458) shows seven chromosomes as expected, namely (from large to small) the neo-X, two large autosomes, neo-Y_1, neo-Y_2 and two small autosomes. Oogonial mitosis (Fig. 459) shows the expected six chromosomes, namely (from large to small) the two neo-X chromosomes, two large autosomes and two small autosomes.

As mentioned above *D. nodulicarinus septeni* possibly originated from *D. nodulicarinus novenus* by means of the fusions of the homologous chromosomes of a small autosome to the original X- and Y-chromosomes respectively. The relative sizes of the chromosomes (compare Tables 9.21 and 9.22), however, suggest that they may have originated independently from *D. nodulicarinus nodulicarinus* or another ancestor. It is evident that the large autosome is larger in *D. nodulicarinus novenus* than in *D. nodulicarinus septeni* (32% versus 24% of the total chromosome area) while the neo-X is larger in *D. nodulicarinus septeni* (34.5% versus 27%). Although the latter is to be expected because of the extra autosome fused to it, the difference is larger than can be explained by the fusion. Further confirmation of this is that the neo-Y_1 (which is the homologue of the large autosomal part of the neo-X) is also larger in *D. nodulicarinus septeni* (20.7% versus 16.3%). The different frequency and location of the crossovers in the large autosome and neo-X-neo-Y_1 'bivalent' between these taxa are also indicative of the size and structural differences between them and support their independent origin. Further study and analysis would be necessary to confirm this.

9.2.1.4. Discussion.

In *D. nodulicarinus septeni* two crossovers often occur between the neo-Y_1 and neo-X chromosomes (in 46% of the cells) and this has complications for the segregation of the chromosomes and may throw some light on the location of spindle attachment. It is known that in the Heteroptera the spindle usually attaches over a large part of the length of the chromosomes during mitosis (Buck 1967, Comings & Okada 1972, Ruthmann.& Permantier 1973) while it usually attaches to the chromosome ends during meiosis (Schrader 1935, Hughes-Schrader & Schrader 1961, Nokkala 1985, González-García *et al.* 1996, Pérez *et al.* 1997) although Nokkala & Nokkala (1996) suggested that microtubules may also attach to those regions of chromatids lying parallel to the equatorial plane during meiosis. In *Psylla försteri* (Homoptera) the large bivalent/chromosome always orientates with its long axis parallel to the equatorial plate at MI and MII and the spindle fibres apparently attach themselves to its whole poleward surface (Suomalainen & Halkka 1963).

From the following figure, which depicts the case in *D. nodulicarinus septeni*, it is obvious that if the spindle attaches to the free distal ends of the 'bivalent', it would follow that all two and four strand double crossovers (50% of the cases) would result in the original X part of the neo-X (as well as the original Y) undergoing chromosome and not chromatid segregation. Only three strand double crossovers (50% of the cases) would result in chromatid segregation of the original X (and Y). However, all AI and MII cells show that chromatid segregation of the original X and Y is the rule without exception.



To ensure the regularly observed segregation pattern there are the following possibilities:

The spindle may attach to the two chromatids of the original X-chromosome and not to its large autosomal part. This is, however, unlikely because:

a. Both ends of the original X are fused with autosomes which are involved in chiasmata. This would imply that the spindle fibres attach to the main body of the X-chromosome and not to the chromosome ends as is usually the case in Heteropteran meiosis. Although this may be possible and even likely (see point 4.), one would then expect that it would also happen to the autosomal and neo-Y_2 parts of structure and not to the original X alone.

b. It would imply that there are no spindle fibres attached to the neo-Y_1 and that they are dragged along to the poles by their chiasmatic association with the neo-X. It is, however, the rule that the chiasmata break down during early AI and one would expect that they would be unable to segregate to the poles but form laggards on the equatorial plate. This as well as the presumed deletion MII cells, was never observed.

1. The distal chiasmata may terminalize completely before the spindle attaches. This would, however, require the attachment of the spindle to each pair of adjacent chromatids although they have originated from different chromosomes. This is unlikely and it has been demonstrated that the chiasmata do not terminalize in the Heteroptera (Nokkala & Nokkala 1996, Pérez et al. 1997).
2. The spindle may attach to the free ends of the neo-Y_2 (= original Y-chromosome). The neo-Y_2 is, however, attached to the rest of the structure by means of a terminal chiasma and would thus be unable to drag along the other chromosomes (see point 1b).
3. The spindle fibres do not attach to the chromosome ends as is normally the case but to the main body of the chromosome between the two chiasmata (probably at various points) as is the case during mitosis. The crossover between the spindle attachment area and the original X would then assure the chromatid segregation of the latter. It is also probable that the spindle simultaneously attaches to the chromatids of the original X (and possibly to the original Y as well - although it is more probable that the spindle attaches to its free ends as its orientation at MI suggests) to assist their segregation.

This type of spindle attachment could also explain the broadside movement of the large chromosomes during AI (as was also observed in *D. nodulicarinus novenus*) and it can be argued that the large chromosomes have various potential attachment areas. The large chromosomes are the result of the fusion of various small chromosomes and it is possible that interstitial telomeric sequences may serve as attachment points for the spindle.

The following arguments against this mode of spindle attachment can be raised:

a. It would probably imply different modes of spindle attachment depending on the location and number of chiasmata (two chiasmata or a single terminal chiasma ➜ interstitial spindle attachment; single interstitial chiasma ➜ telomeric spindle attachment).

b. Although interstitial or holocentric spindle attachment has been suggested for large chromosomes and the broadsided movement of chromosomes has been described previously (Schrader 1935, Suomalainen & Halkka 1963), most of the recent investigations support the telomeric attachment of the spindle during meiosis.

Further investigation is necessary to elucidate the spindle attachment to this structure.

Very few XY_n sex chromosome systems have thus far been reported in the Heteroptera. Pfaler-Collander (1941) reported that some individuals of *Lygaeus equestris* have two Y chromosomes that are smaller than the usual small Y-chromosome. The same situation was subsequently described for *L. hospes* and *L. pandurus* (Barik et al. 1981, Manna & Deb-Mallick 1986). They found that in both these species there are two types of X-chromosomes and three types of Y-chromosomes namely the usual original X, a smaller X_1 that probably originated after a small segment broke off the original X, the original Y, a smaller Y_1 that probably originated after a small segment broke off the original Y, and Y_2 which is presumably the fusion product of the small parts that broke off the X and Y.

In the above three lygaeid bugs only a few individuals in the population exhibit the XY_1Y_2 sex chromosome system (11 of 230 specimens in *L. hospes* and 6 of 80 specimens in *L. pandurus*). These individuals could not morphologically or otherwise be told apart from the rest of the population.

A few cases of polymorphism for sex chromosome systems where "supernumery" Y-chromosomes occur have been reported in the Heteroptera. Wilson (1907, 1909, 1910) described the situation in three species of *Acanthocephala* (as *Metapodius*)(Coreidae) namely *A. femoratus*, *A. granulosa* and *A. terminalis*. All three species have the basic coreid type chromosome constitution of 2n(♂) = 21 (18A + 2m + X0) but many of the individuals have in addition one to five supernumery Y-chromosomes. The Y elements form a chain with the single X at MII and segregate regularly to the opposite pole than the X. The extra Y-chromosomes were suspected to be supernumeraries because they seemed to have no genetical or morphological effect.

The only two species that have been reported as having an XY_n sex chromosome system as the norm is *Rhyparochromus angustatus* (Lygaeidae) [reported by Takenouchi & Muramoto (1968) as cited by Ueshima (1979)] and *Cryptostemma pusillimum* (Dipsocoridae) (Grozeva & Nokkala 1996).

I have not read the original paper of Takenouchi & Muramoto (which is in Japanese) and therefore do not know how many specimens they studied and how many details of their findings are presented. If one, however, compares the chromosome number of *Rhyparochromus angustatus* (2n(♂) = 15 (10A + 2m + XY_1Y_2) with that of two other *Rhyparochromus* species (listed by Ueshima 1979) which both have 2n(♂) = 14 (10A + 2m + XY) it is evident that the XY_1Y_2 system in *R. angustatus* probably originated by means of fragmentation of the Y-chromosome. It must, however, be noted that the findings of Takenouchi & Muramoto have often been in disagreement with the findings of other authors. For example: they (1967) listed *Saldula saltatoria* as having 2n(♂) = 36XY while Cobben (1968) found it to be 2n(♂) = 35X0; they (1968) found *Gerris paludum* to have 2n(♂) = 24XY while Wilke (1913) reported it to be 2n(♂) = 23X0; they (1968) found *Hydrometra procera* to be 2n(♂) = 20XY while two other *Hydrometra* species are 2n(♂) = 19X0 (Jande 1959, Cobben 1968).

In the well documented case of *Cryptostemma pusillimum* the two Y-chromosomes are rather small, only slightly larger than the m-chromosomes and much smaller than the autosomes and X-chromosome. Grozeva & Nokkala came to the conclusion that "there is certainly no doubt that these multiple Y chromosomes of *C. pusillimum* have evolved from the Y chromosome by fragmentation". Unfortunately they did not state how many individuals they studied.

In all of the above cases the multiple Y-chromosomes originated by means of fragmentation. The XY_1Y_2 sex chromosome system of *Dundocoris nodulicarinus novenus* and *D. nodulicarinus septeni* are thus the first reported cases in the Heteroptera where such a system originated by a X-chromosome-autosome fusion. The case of *D. nodulicarinus septeni* where three autosome-sex chromosome (two X-autosome and one Y-autosome) fusions were involved in the creation of its sex chromosome system and where the two homologous autosomes were both involved in fusions with the X- and Y-chromosome respectively, have, to my knowledge, not previously been encountered in any organism.

9.2.2 ***Dundocoris marieps*** (Figs 260, 460-461)

The chromosome number of *D. marieps* is 2n(♂) = 28XY. The true and relative chromosome areas of *D. marieps* are presented in Table 9.23 and an idiogram in Fig. 260.

Table 9.23. True and relative chromosome areas of *D. marieps*.

True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Mariepskop forest**	**Mariepskop forest**
Individuals	**2**	**2**
Cells	**9**	**9**
A1	**4.02(±0.36)**	**9.63(±0.26)**
A2	**3.88(±0.37)**	**9.29(±0.18)**
A3	**3.69(±0.37)**	**8.84(±0.22)**
A4	**3.60(±0.42)**	**8.60(±0.28)**
A5	**3.38(±0.35)**	**8.08(±0.19)**
A6	**3.32(±0.32)**	**7.95(±0.13)**
A7	**3.24(±0.31)**	**7.77(±0.13)**
A8	**3.19(±0.28)**	**7.65(±0.15)**
A9	**3.08(±0.31)**	**7.39(±0.22)**
A10	**2.94(±0.27)**	**7.05(±0.14)**
A11	**2.77(±0.24)**	**6.65(±0.30)**
A12	**2.38(±0.25)**	**5.70(±0.23)**
A13	**2.26(±0.27)**	**5.41(±0.23)**
X	**8.35(±0.88)**	**20.02(±1.21)**
Y	**6.37(±0.72)**	**15.23(±0.67)**
Autosomes	**41.75(±3.98)**	
All chromosomes	**56.47(±5.43)**	

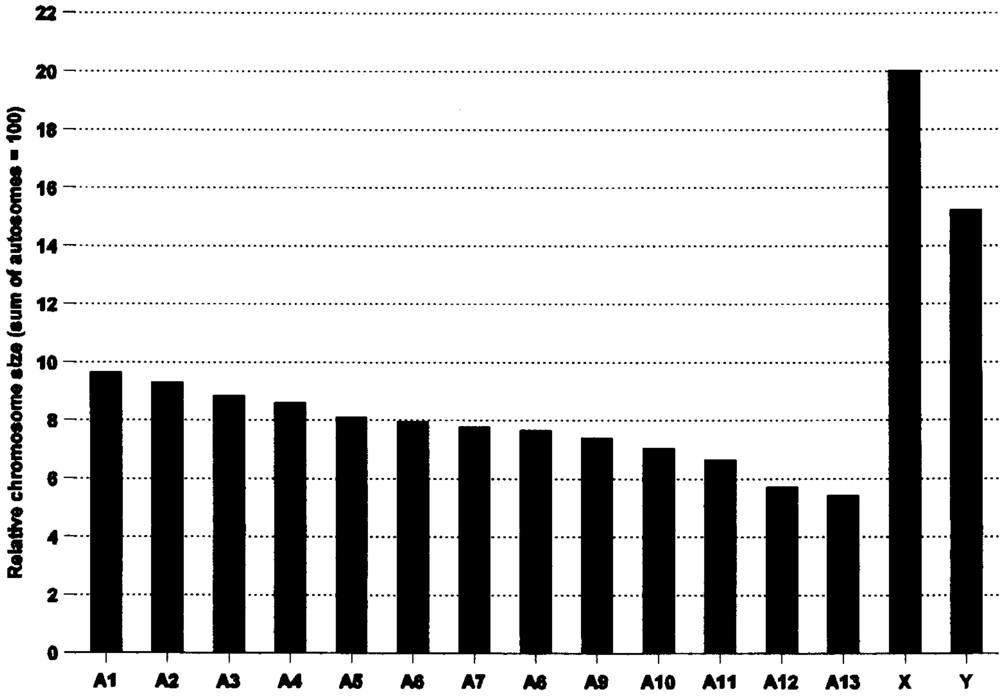


Figure 260. Idiogram of *Dundocoris marieps*.

The autosomes form a gradual size series except for A12 and A13 which is set apart by a slight step in the series. The sex chromosomes are by far the largest chromosomes in the complement - the X-chromosome is more than twice the size of the largest autosome while the Y-chromosome is nearly 1.6x as large as the largest autosome.

D. marieps occurs sympatrically with *D. fuscus* at Mariepskop and individuals of both species are often found in close proximity to each other. The chromosome number of *D. fuscus* is also 2n(♂) = 28XY and its karyotype is very similar to that of *D. marieps* except for the sex chromosomes that are distinctly smaller.

9.2.3 *Dundocoris begemanni* (Figs 261, 462).

The chromosome number of *D. begemanni* is 2n(♂) = 26XY. The true and relative chromosome areas are presented in Table 9.24 and an idiogram in Fig. 261. Although cytogenetic preparations of 5 individuals were made the MII cells found were not well spread and therefore MI cells were used for measurements. The largest autosome (A1) is much larger (1.4x) than the second largest autosome (A2). A2-A12 form a more or less gradual size series but small steps set apart A2 and A12. The sex chromosomes are large as in the previous species. The X-chromosome is the largest chromosome in the complement, about twice the size of A2. The latter probably represents the largest autosome of an ancestor before a fusion gave rise to the large A1 and is thus comparable with A1of the previous species. The Y-chromosome is about 1.35x the size of A2 and slightly smaller than A1.

Table 9.xx. True and relative chromosome areas of *D. begemanni* at metaphase 1.

True chromosome areas (µm²) and standard deviation.		**Relative chromosome areas (% of total area of autosomes) and standard deviation.**
Chromosome	**Injasuti forest**	**Injasuti forest**
Individuals	**1**	**1**
Cells	**2**	**2**
A1	**9.94(±0.68)**	**14.65(±0.30)**
A2	**7.00(±0.13)**	**10.32(±0.68)**
A3	**6.19(±0.16)**	**9.13(±0.17)**
A4	**5.94(±0.08)**	**8.76(±0.28)**
A5	**5.85(±0.19)**	**8.60(±0.14)**
A6	**5.53(±0.14)**	**8.14(±0.19)**
A7	**5.31(±0.35)**	**7.82(±0.17)**
A8	**5.06(±0.21)**	**7.46(±0.03)**
A9	**4.79(±0.08)**	**7.06(±0.22)**
A10	**4.51(±0.39)**	**6.65(±0.29)**
A11	**4.21(±0.77)**	**6.21(±0.87)**
A12	**3.53(±0.22)**	**5.20(±0.07)**
X	**13.33(±0.34)**	**19.71(±0.32)**
Y	**9.51(±0.26)**	**14.07(±0.96)**
Autosomes	**67.86(±3.14)**	
All chromosomes	**90.70(±3.22)**	

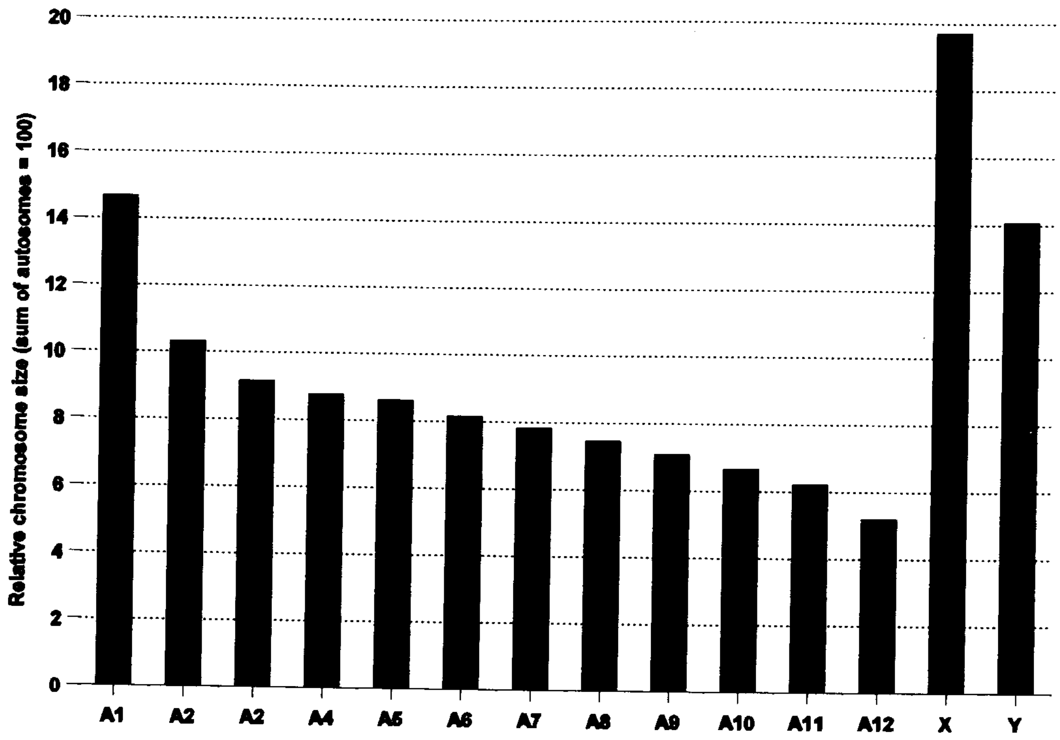


Figure 261. Idiogram of *Dundocoris begemanni*.

D. begemanni probably originated from a 28XY ancestor (refer also to the discussion in 9.2.12) by means of a fusion of two autosomes. It is possible that one of the smallest autosomes (A12 or A13) of the ancestor fused with the second largest autosome (A2) to form the large autosome of *D. begemanni*. The small steps between A2/A3 and A11/A12 support this hypothesis.

9.2.4 ***Dundocoris stuckenbergi*** (Figs 262-263, 263A, 463-468).

D. stuckenbergi encompasses two subspecies that are morphologically indistinguishable but have different chromosome numbers and karyotypes. Two specimens of a possible third subspecies were also collected - they are smaller than specimens of the other subspecies and although their autosomal karyotype is very similar to that of one of the described subspecies (*D. stuckenbergi ngomensis*) the sex chromosomes are markedly smaller.

9.2.4.1. ***Dundocoris stuckenbergi stuckenbergi*** (Figs 262, 463-464).

The chromosome number of *D. stuckenbergi stuckenbergi* is 2n(♂) = 26XY. The true and relative chromosome areas are presented in Table 9.25 and an idiogram in Fig. 262. The largest autosome (A1) is about 1.5x as large as A2. A2-A12 form a more or less gradual size series with a slight step between A2 and A3 and autosomes A11 and A12 also seem to be set apart by a small step. The sex chromosomes are subequal in size and by far the largest chromosomes in the complement. The X-chromosome is about 2.37x and the Y-chromosome about 2.23x as large as A2.

D. stuckenbergi stuckenbergi probably originated from *D. stuckenbergi ngomensis* or an ancestor with similar karyotype by means of the fusion of two autosomes. A fusion between the second largest chromosome (A2) and one of the smaller chromosomes, maybe A10 or A11 (but not A12 or A13 as they are set apart by a small step in the ancestor as well - see discussion in 9.2.12) of the ancestor will be consistent with the observed steps in the karyotype of *D. stuckenbergi stuckenbergi* as well as with the size of A1.

Table 9.25. True and relative chromosome areas of *D. stuckenbergi stuckenbergi*.

True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Town Bush**	**Town Bush**
Individuals	**1**	**1**
Cells	**6**	**6**
A1	**2.76(±0.47)**	**15.31(±0.80)**
A2	**1.86(±0.28)**	**10.35(±0.64)**
A3	**1.60(±0.18)**	**8.92(±0.38)**
A4	**1.57(±0.18)**	**8.76(±0.32)**
A5	**1.50(±0.20)**	**8.36(±0.20)**
A6	**1.45(±0.19)**	**8.05(±0.18)**
A7	**1.37(±0.14)**	**7.66(±0.26)**
A8	**1.33(±0.14)**	**7.41(±0.27)**
A9	**1.29(±0.15)**	**7.18(±0.36)**
A10	**1.22(±0.16)**	**6.79(±0.26)**
A11	**1.07(±0.18)**	**5.91(±0.40)**
A12	**0.96(±0.17)**	**5.31(±0.57)**
X	**4.41(±0.79)**	**24.43(±2.15)**
Y	**4.15(±0.85)**	**22.90(±2.32)**
Autosomes	**18.00(±2.31)**	
All chromosomes	**26.56(±3.88)**	

9.2.4.2. *Dundocoris stuckenbergi ngomensis* (Figs 263, 465-467).

The chromosome number of *D. stuckenbergi ngomensis* is 2n(♂) = 28XY. The true and relative chromosome areas are presented in Table 9.26 and an idiogram in Fig. 263. It has the typical *Dundocoris* ancestral karyotype where the autosomes form a gradual size series except for A12 and A13 which are set apart by a slight step in the series. The sex chromosomes are, however, extremely large, the largest of all *Dundocoris* taxa. The X-chromosome is 3.3x and the Y-chromosome is about 2.8x as large as the largest autosome.

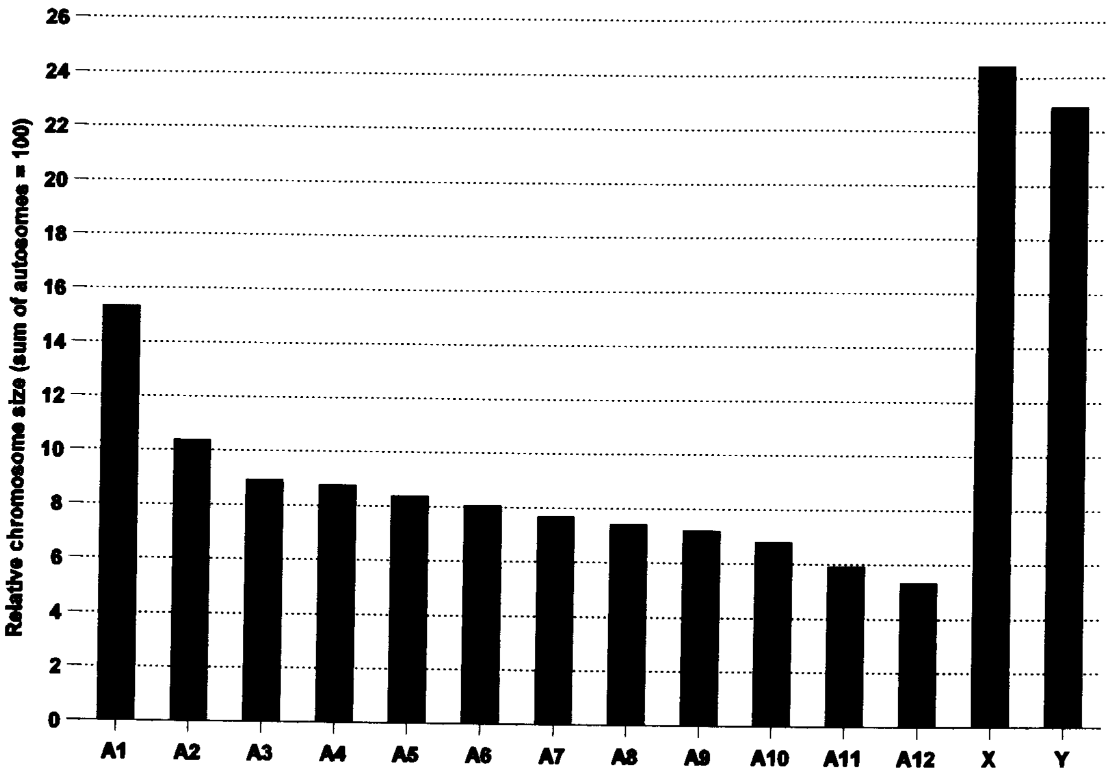


Figure 262. Idiogram of *Dundocoris stuckenbergi stuckenbergi*.

Table 9.xx. True and relative chromosome areas of *D. stuckenbergi ngomensis*.

True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	Ngome forest	Ngome forest
Individuals	2	2
Cells	6	6
A1	2.39(±0.47)	9.75(±0.36)
A2	2.19(±0.42)	8.91(±0.11)
A3	2.14(±0.40)	8.72(±0.14)
A4	2.10(±0.41)	8.55(±0.11)
A5	2.03(±0.36)	8.28(±0.10)
A6	1.99(±0.37)	8.10(±0.19)
A7	1.95(±0.36)	7.96(±0.14)
A8	1.92(±0.35)	7.82(±0.12)
A9	1.81(±0.39)	7.36(±0.28)
A10	1.69(±0.34)	6.85(±0.15)
A11	1.64(±0.33)	6.68(±0.17)
A12	1.42(±0.28)	5.76(±0.31)
A13	1.29(±0.23)	5.26(±0.11)
X	7.93(±1.73)	32.21(±1.78)
Y	6.64(±1.29)	27.10(±0.85)
Autosomes	24.55(±4.67)	
All chromosomes	39.12(±7.64)	

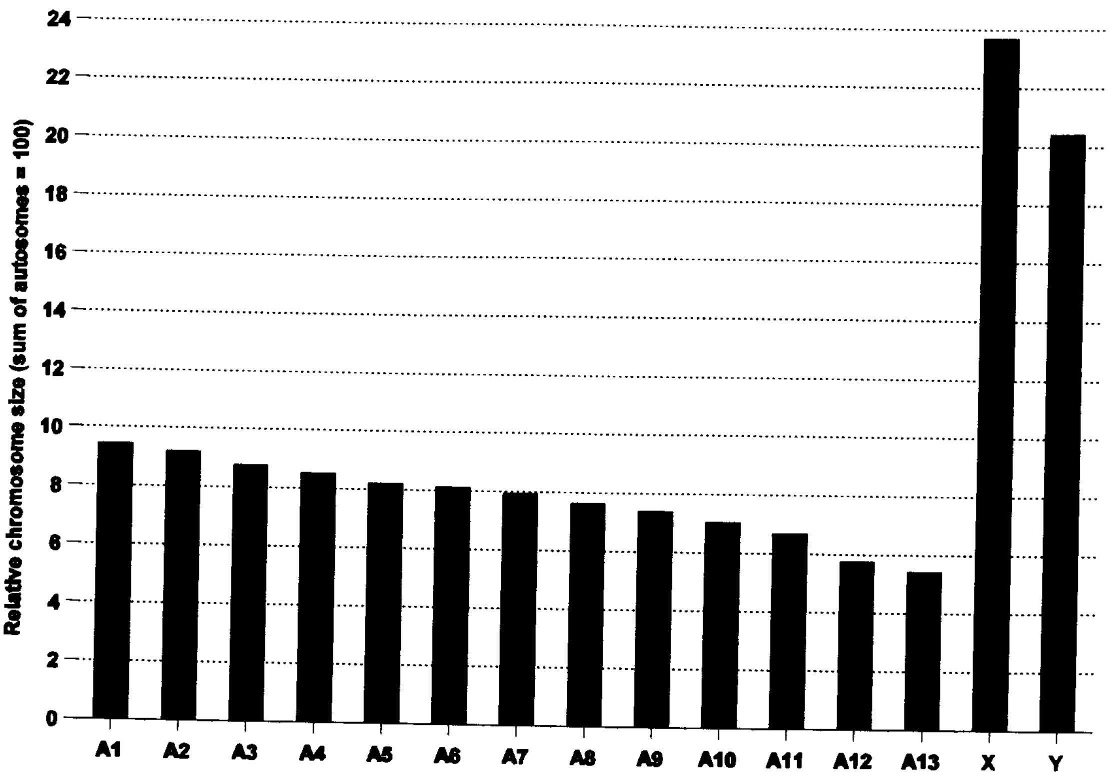


Figure 263A. Idiogram of *Dundocoris stuckenbergi subspec.* nov?

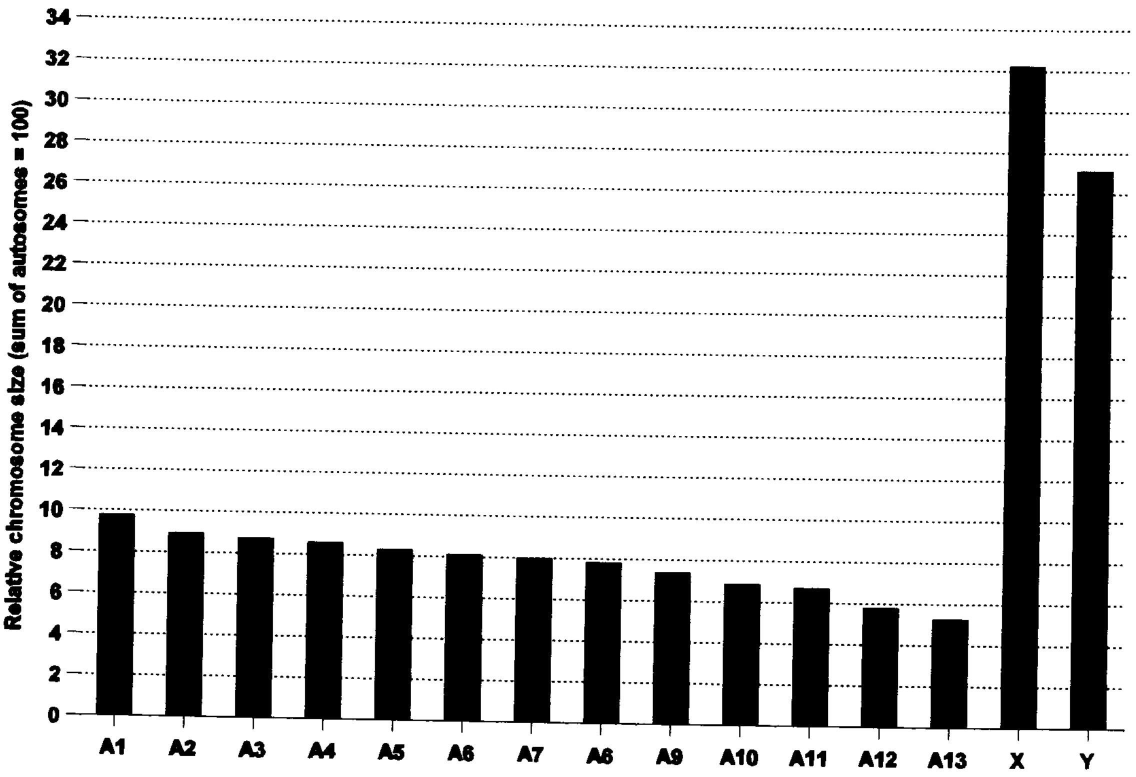


Figure 263. Idiogram of *Dundocoris stuckenbergi ngomensis*.

9.2.4.3. *Dundocoris stuckenbergi subspec.* nov? (Figs 263A, 468).

A male and female of a possibly undescribed subspecies were collected in Ngoye forest in northern Kwazulu-Natal. Its chromosome number is 2n(♂) = 28XY and an idiogram of its karyotype is presented in Fig. 263A. Its karyotype is very similar to that of *D. stuckenbergi ngomensis* except that the sex chromosomes are smaller. The X-chromosome is 2.5x and the Y-chromosome 2.17x as large as the largest autosome.

9.2.5. *Dundocoris nigromaculatus.* (Figs 264, 469-470).

The chromosome number of *D. nigromaculatus* is 2n(♂) = 20XY. The true and relative chromosome areas are presented in Table 9.27 and an idiogram in Fig. 264. There is a substantial difference in size between the five largest autosomes (A1-A5) while A6-A9 form a more gradual size series. The sex chromosomes are relatively small; the X-chromosome is just larger than A3 but smaller than A1 & A2, while the Y-chromosome is only slightly larger than A5.

D. nigromaculatus supposedly originated from an 28XY ancestor by means of four fusions. Two of the largest autosomes of the ancestor probably fused to form A1 while two of the smallest autosomes fused to form A4. A2 and A3 were formed by indeterminable fusions of some of the other autosomes.

Table 9.27. True and relative chromosome areas of *D. nigromaculatus*.

True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Ngoye forest**	**Ngoye forest**
Individuals	**1**	**1**
Cells	**6**	**6**
A1	**5.87(±0.87)**	**21.49(±0.86)**
A2	**4.30(±0.76)**	**15.67(±0.58)**
A3	**3.68(±0.68)**	**13.38(±0.50)**
A4	**3.15(±0.48)**	**11.52(±0.25)**
A5	**2.58(±0.48)**	**9.39(±0.26)**
A6	**2.18(±0.36)**	**7.95(±0.23)**
A7	**2.06(±0.35)**	**7.52(±0.08)**
A8	**1.87(±0.29)**	**6.83(±0.18)**
A9	**1.71(±0.26)**	**6.25(±0.37)**
X	**3.87(±0.62)**	**14.13(±0.56)**
Y	**2.76(±0.49)**	**10.05(±0.42)**
Autosomes	**27.40(±4.46)**	
All chromosomes	**34.03(±5.54)**	

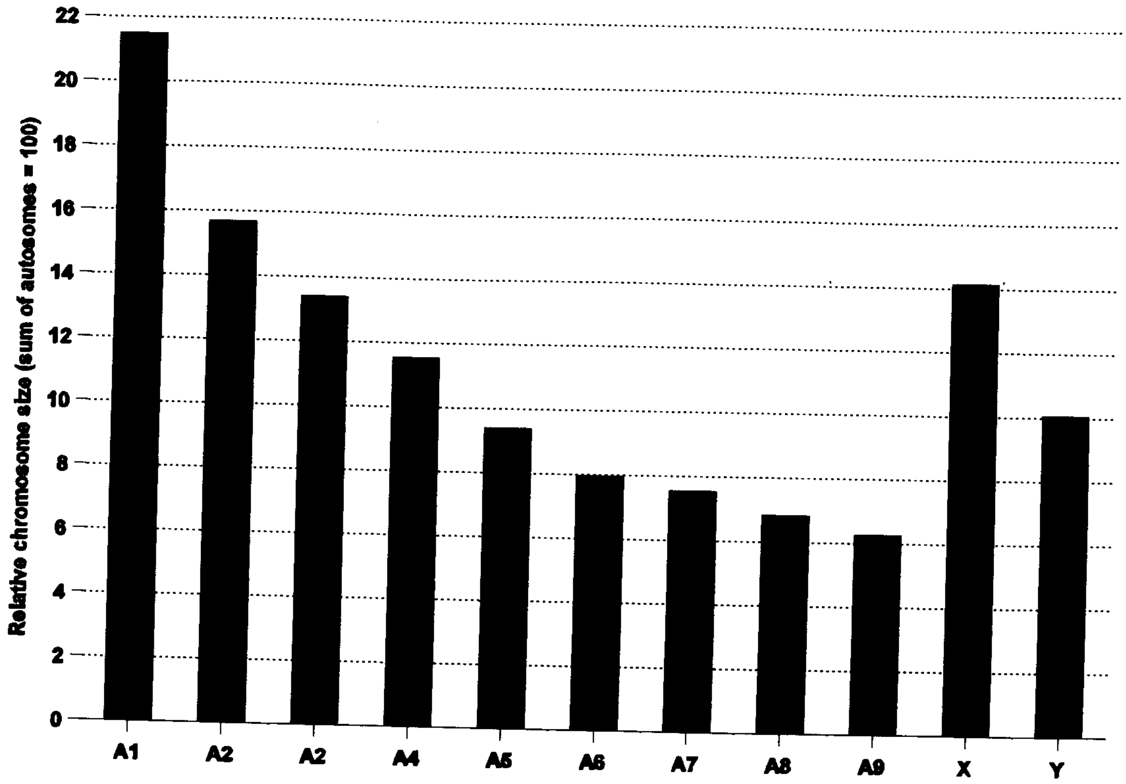


Figure 264. Idiogram of *Dundocoris nigromaculatus*.

9.2.6. **_Dundocoris flavilineatus._** (Figs 265-266, 471-487).

Two subspecies are recognized, mainly on account of their different chromosome number although there also seems to be a slight size difference between them. *D. flavilineatus flavilineatus* has a chromosome number of 2n = 28XY and is slightly smaller than *D. flavilineatus ndabeniensis* with $2n = 27X_1X_2Y$. The nominate subspecies occurs widespread in Kwazulu-Natal and also in the Eastern Cape while *D. flavilineatus ndabeniensis* is probably restricted to the Ndabeni forest in northern Kwazulu-Natal.

9.2.6.1. **_Dundocoris flavilineatus flavilineatus._** (Figs 265, 471-474).

The chromosome number of *D. flavilineatus flavilineatus* is 2n(♂) = 28XY. The true and relative chromosome areas for three localities are presented in Table 9.28 and idiograms for the three localities in Fig. 265. *D. flavilineatus flavilineatus* exhibit the typical ancestral *Dundocoris* karyotype where the autosomes form a more or less gradual size series with perhaps a small step that sets apart A11 and A12, and large X- and Y-chromosomes.

The three populations used for the idiograms come from localities that are far apart from each other (at least 120 km) without interconnecting forests between them. Given the low vagility of the apterous Carventinae it can be assumed that they have been isolated for at least several thousands of years. The idiograms of the populations at the three localities are very similar in respect to the autosomes - the differences between them can probably be accounted to variation in the squashing and measurement errors. The sex chromosomes, however, differ markedly between the three localities. The X-chromosome of the Mpsheni Forest population is markedly smaller than those of the other populations and the Y-chromosome of the Ngoye Forest population is markedly larger than those of the other populations. Size differences in the sex chromosomes between populations and even between individuals of the same population is fairly common in the Heteroptera.

Table 9.28. True and relative chromosome areas of *D. flavilineatus flavilineatus*.

True chromosome areas (μm^2) and standard deviation.				
Chromosome	**Mpesheni forest**	**Ngoye forest**	**Scottburgh**	**TOTAL**
Individuals	1	1	2	4
Cells	3	11	4	18
A1	2.89(±0.06)	2.46(±0.18)	3.70(±1.12)	2.81(±0.71)
A2	2.68(±0.17)	2.27(±0.14)	3.29(±0.85)	2.56(±0.57)
A3	2.48(±0.19)	2.22(±0.15)	3.18(±0.90)	2.48(±0.56)
A4	2.45(±0.19)	2.15(±0.14)	3.08(±0.88)	2.41(±0.55)
A5	2.36(±0.11)	2.07(±0.15)	2.95(±0.83)	2.31(±0.52)
A6	2.23(±0.07)	1.95(±0.15)	2.76(±0.75)	2.17(±0.47)
A7	2.13(±0.08)	1.92(±0.15)	2.63(±0.67)	2.11(±0.43)
A8	2.02(±0.02)	1.87(±0.17)	2.56(±0.66)	2.05(±0.42)
A9	2.01(±0.03)	1.83(±0.17)	2.47(±0.62)	2.00(±0.39)
A10	1.93(±0.08)	1.77(±0.16)	2.38(±0.70)	1.93(±0.41)
A11	1.82(±0.06)	1.61(±0.12)	2.23(±0.63)	1.78(±0.38)
A12	1.60(±0.06)	1.55(±0.11)	2.03(±0.59)	1.66(±0.33)
A13	1.50(±0.01)	1.35(±0.14)	1.75(±0.45)	1.46(±0.27)
X	3.97(±0.30)	4.60(±0.40)	5.99(±1.26)	4.80(±0.93)
Y	3.10(±0.18)	3.51(±0.30)	4.12(±1.12)	3.58(±0.62)
Autosomes	28.09(±0.85)	25.01(±1.83)	35.01(±9.64)	27.75(±5.98)
All chromosomes	35.17(±1.24)	33.12(±2.40)	45.12(±11.98)	36.13(±7.34)
Relative chromosome areas (% of total area of autosomes) and standard deviation.				
A1	10.31(±0.46)	9.84(±0.29)	10.51(±0.35)	10.07(±0.43)
A2	9.54(±0.32)	9.08(±0.24)	9.42(±0.20)	9.24(±0.30)
A3	8.83(±0.40)	8.90(±0.20)	9.07(±0.15)	8.92(±0.23)
A4	8.71(±0.41)	8.62(±0.19)	8.78(±0.09)	8.67(±0.22)
A5	8.41(±0.18)	8.28(±0.17)	8.40(±0.26)	8.33(±0.19)
A6	7.91(±0.06)	7.79(±0.14)	7.88(±0.04)	7.83(±0.12)
A7	7.57(±0.24)	7.66(±0.16)	7.53(±0.19)	7.62(±0.18)
A8	7.20(±0.14)	7.46(±0.19)	7.36(±0.17)	7.39(±0.20)
A9	7.13(±0.12)	7.33(±0.18)	7.11(±0.25)	7.25(±0.21)
A10	6.87(±0.09)	7.06(±0.24)	6.76(±0.21)	6.97(±0.25)
A11	6.48(±0.16)	6.42(±0.14)	6.36(±0.11)	6.42(±0.14)
A12	5.69(±0.38)	6.18(±0.17)	5.79(±0.19)	6.01(±0.30)
A13	5.35(±0.14)	5.38(±0.28)	5.01(±0.12)	5.29(±0.27)
X	14.13(±0.72)	18.41(±1.01)	17.39(±1.38)	17.47(±1.88)
Y	11.04(±0.49)	14.04(±0.81)	11.80(±0.59)	13.04(±1.48)

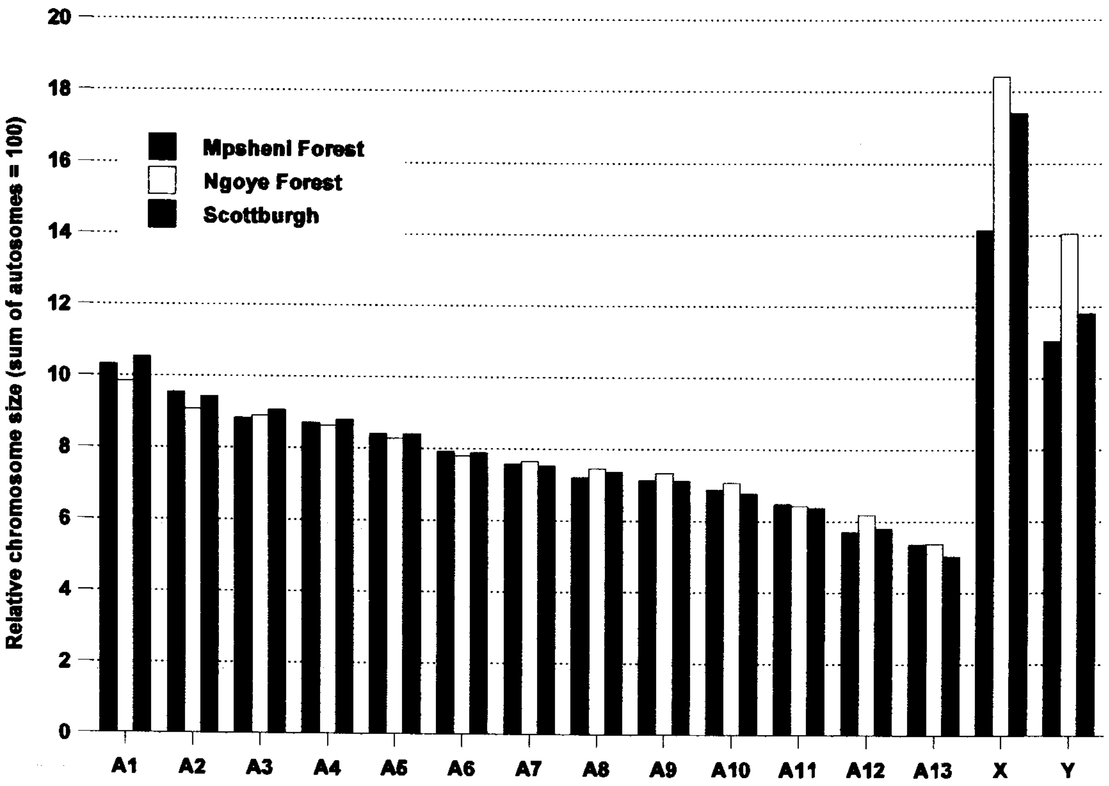


Figure 265. Idiogram of *Dundocoris flavilineatus flavilineatus*.

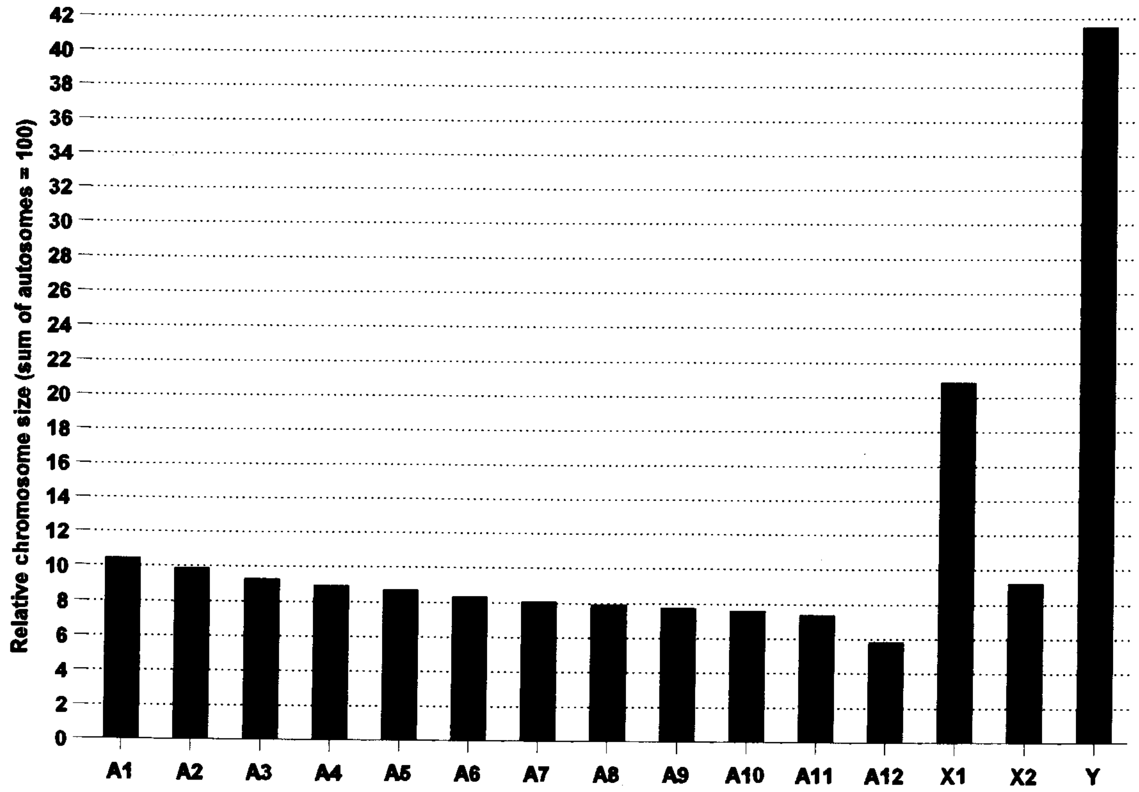


Figure 266. Idiogram of *Dundocoris flavilineatus ndabeniensis*.

9.2.6.2. *Dundocoris flavilineatus ndabeniensis*. (Figs 266, 475-487).

The chromosome number of *D. flavilineatus ndabeniensis* is 2n(♂) = $27X_1X_2Y$, although the possibility exists that it is actually $27XY_1Y_2$ as no females were studied (refer to 9.2.6.3). The true and relative chromosome areas are presented in Table 9.29 and an idiogram in Fig. 266. The autosomes form a gradual size series but a small step sets off A12. The Y-chromosome (actually a neo-Y) is by far the largest chromosome in the complement, being about 4x the size of the largest autosome. The original X-chromosome (X_1) is the second largest chromosome, about twice the size of the largest autosome while the neo-X (X_2) chromosome is about the size of A3. The multiple sex chromosome system of *D. flavilineatus ndabeniensis* also originated by a fusion between a sex chromosome and an autosome but the details and behaviour of the chromosomes differ markedly from that described in *D. nodulicarinus*.

At pachytene the original X-chromosome (X_1) forms a positive heterochromatic body which is usually roundish in shape but sometimes its linear shape is apparent as it is twisted and folded in various ways. The Y-chromosome is usually also positively heterochromatic but more or less linear in shape and the junction between the original Y-chromosome part and the autosomal part (which probably incorporate X_2 as well) is often evident as a constriction (Fig. 475). The two sex chromosome structures are often associated but apart from each other in a significant number of cells. When they are apart nucleoli are often associated with both these structures - in the neo-Y it occurs near the free end of the original Y-chromosome. It is unclear whether true synapsis forms between the neo-X (X_2) and the autosomal part of the neo-Y.

Table 9.29. True and relative chromosome areas of *D. flavilineatus ndabeniensis*.

	True chromosome areas (µm²) and standard deviation.	Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Ndabeni forest**	**Ndabeni forest**
Individuals	**2**	**2**
Cells	**11**	**11**
A1	**1.99(±0.15)**	**10.43(±0.37)**
A2	**1.88(±0.13)**	**9.85(±0.33)**
A3	**1.77(±0.10)**	**9.28(±0.21)**
A4	**1.70(±0.09)**	**8.92(±0.20)**
A5	**1.66(±0.09)**	**8.70(±0.20)**
A6	**1.59(±0.10)**	**8.32(±0.17)**
A7	**1.54(±0.09)**	**8.08(±0.13)**
A8	**1.51(±0.09)**	**7.92(±0.14)**
A9	**1.48(±0.09)**	**7.75(±0.13)**
A10	**1.44(±0.09)**	**7.57(±0.14)**
A11	**1.40(±0.09)**	**7.35(±0.17)**
A12	**1.11(±0.05)**	**5.83(±0.18)**
X_1	**3.97(±0.29)**	**20.85(±1.12)**
X_2	**1.75(±0.15)**	**9.20(±0.75)**
Y	**7.91(±0.59)**	**41.47(±1.22)**
Autosomes	**19.07(±1.05)**	
All chromosomes	**32.70(±1.91)**	

During the diffuse stage X_1 and the neo-Y are positively heterochromatic and nearly always associated. The X_1 usually forms a smooth, circular body with the more or less thick filamentous neo-Y attached to it with it original Y-chromosome end. The distal autosomal subdivision of the neo-Y often exhibits chromomere-like nodules. The nucleoli usually occur in the region where the X_1 and Y are associated. The individual autosomes are not discernable at this stage. As the diffuse stage gradually advances to diplotene the autosomal bivalents become discernable, firstly as filamentous patches with heterochromatic chromomere-like nodules without the individual chromosomes and chromatids discernable but later the they can be distinguished as nodulated filaments. At this stage it also becomes evident that the euchromatic X_2, which may be a considerable distance away, is attached to the heterochromatic neo-Y by means of thin, often nearly invisible filaments, supposedly representing a terminalized chiasma. It now becomes apparent that the X_2-neo-Y 'bivalent' contain three distinct subdivisions namely:

1. A thick, heterochromatic, relatively smooth part that is also the largest and represents the original Y-chromosome.
2. A somewhat thinner, heterochromatic, nodulated part that is slightly smaller than the previous part and represent the autosomal part of the neo-Y.
3. A thin, euchromatic, usually distant part that represent the neo-X (X_2) which is probably attached to the second part by a terminalized chiasma.

The first two subdivisions stay visible until late diakinesis and the third until AI.

At diplotene the chiasmata also become visible. Roughly a third of the bivalents have non terminal chiasmata (1/0) while the rest are associated at their ends by means of terminal chiasmata or perhaps non chiasmate associations. The sex chromosomes are usually still associated at this stage. In cells where they are separate, nucleoli are often associated with both the X_1 and neo-Y, indicating that both probably have NOR's.

At diakinesis the chromosomes spiralize so that during the latter part of this stage the chromosomes become isopicnotic or the sex chromosomes are only slightly heteropicnotic. The X_1 and neo-Y invariably detach and the tripartite structure of the X_2-neo-Y 'bivalent' is very clear. The first two subdivisions are now the same thickness but separated by a less intensely stained constriction while the third subdivision (X_2) is thinner and separated by an unstained area except for the thin filaments that attach it to the neo-Y. Nucleoli are usually not present but rarely small fragments persist that are associated with the X_1 or neo-Y or both. As result of spiralization all bivalents look more or less the same and it is not possible to tell the bivalents with a non-terminal chiasma (1/0) apart from those with a terminal chiasma (1/1), thus making chiasma analysis at this stage and at MI unreliable.

At MI all the chromosomes are isochromatic. The autosomes together with the sex chromosomes form a peripheral ring, although one or two autosomes sometimes lie inside the ring. The neo-Y-X_2 structure always orientates with its long axis parallel to the equatorial plane. Each chromatid of the neo-Y is now a solid thick rod and its two subdivisions are not discernable any more, while the X_2 subdivision is much thinner and each chromatid is more or less spherical. The X_2 is set apart from the neo-Y by a less intensely stained constriction.

During AI the autosomes segregate regularly (12 chromosomes to each pole) while the X_1, X_2 and neo-Y undergo chromatid segregation and one chromatid of each segregates to each pole.

At MII the autosomes form a peripheral ring with the tripartite sex chromosome structure (consisting of a chromatid each of the X_1, X_2 and neo-Y) in the centre of the ring. The sex chromosome structure always orientates with the neo-Y towards one pole and the X_1 and X_2 towards the opposite pole and during AII they also segregate in this fashion. In two of the individuals a few polyploid MII cells (Fig. 485) were observed. They probably originated as a result of failed cytokinesis.

Spermatogonial mitosis (Figs 486-487) shows 27 chromosomes. The large neo-Y and X_1 chromosomes are clearly distinguishable while all the autosomes and the X_2 are in the same size order.

9.2.6.3. Discussion.

D. flavilineatus ndabeniensis probably originated from *D. flavilineatus flavilineatus* by means of a fusion between its Y-chromosome and an autosome. If we, however, compare the size of X_2 with that of the 'autosomal' part that is attached to the original Y-chromosome it is clear that other structural modifications also took place. The 'autosomal' part of the neo-Y is at least twice the size of X_2 (Fig. 481). It also seems to be permanently heterochromatic while the X_2 is euchromatic. Whether the size difference is the result of the heterochromatization process or of duplications or other reasons is unclear. If we compare the size of X_2 with that of the autosomes it indicates that probably one of the larger autosomes was involved in the fusion. The karyotype of *D. flavilineatus ndabeniensis* where only one small chromosome is set apart by a step in the size series, however, suggests that rather one of the small autosomes (A12 or A13) was involved. It is thus possible that some structural changes also took place in X_2.

One of the main differences between *D. flavilineatus ndabeniensis* and *D. nodulicarinus* is that the autosomal part of the neo-sex chromosome stays euchromatic in the latter while it is heterochromatic in the former from the onset of meiosis. This gives rise to the question of the nature of the association between X_2 and its homologous part on the neo-Y in *D. flavilineatus ndabeniensis* during pachytene - does true synapsis and crossing-over take place? Invariably an end to end association between the X_2 and the neo-Y exist from diplotene to MI but whether it is chiasmate or non-chiasmate [as John & King (1985) found in some of the small bivalents of the grasshoppers *Cryptobothrus chrysophorus* and *Heteropternis obscurella*] is unclear.

It seems as if the two subdivisions of the neo-Y exert an influence on one another. The Y-chromosome which normally forms a spherical, smooth structure at the diffuse and diplotene stages, usually forms an extended or folded rod-like structure in *D. flavilineatus ndabeniensis*. The autosomal part has become heterochromatic but not to the same extent as the Y-chromosome as is evident from its nodulated structure during diplotene. It is unclear why the same has not happened in *D. nodulicarinus* but one possible explanation is that the Y-chromosome is usually constitutive heterochromatic and inert while the X-chromosome is only facultative heterochromatic (in the females the two X-chromosomes are normally euchromatic).

No cytogenetic studies were done on females of *D. flavilineatus ndabeniensis*. By convention its sex chromosome system was described as X_1X_2Y but it could as well be a XY_1Y_2 system. There are no strong indicators to favour the one above the other. Nucleolus organizer regions are usually situated on the X-chromosomes of Heteroptera but here they seem to be present on both of the original sex chromosomes of *D. flavilineatus ndabeniensis*. At diakinesis (Fig. 481) it seems that the original Y-chromosome part of the neo-Y is larger than the original X-chromosome (X_1) indicating that if it is a X_1X_2Y system the Y-chromosome was probably larger than the X-chromosome in its ancestor and thus probably in *D. flavilineatus flavilineatus*. In a XY sex chromosome system the larger of the sex chromosomes is conventionally assigned as the X-chromosome if no females were studied, and although it is usually correct it is not necessarily so. It is possible (and even probable) that in some cases the X and Y chromosomes were assigned incorrectly in *Dundocoris* and the other genera.

9.2.7. ***Dundocoris schoemani.*** (Figs 267-268, 488-492).

D. schoemani contains two subspecies which are nearly identical in morphology, have the same chromosome number and can only reliably be distinguished by their different karyotypes. The nominate subspecies has thus far only been recorded from the montane forests and *D. schoemani dwesaensis* from the coastal forests of the Eastern Cape (former Transkei).

9.2.7.1. ***Dundocoris schoemani schoemani.*** (Figs 267, 488-490).

The chromosome number of *D. schoemani schoemani* is 2n(♂) = 26XY. The true and relative chromosome areas for three localities are presented in Table 9.30 and idiograms for the three localities in Fig. 267. The autosomes form a gradual size series with A1 set apart by a small step. The smallest one or two autosomes are not set apart at all. The sex chromosomes are very large, the X-chromosome is about twice and the Y-chromosome about 1.65x the size of the largest autosome. The idiograms of the populations of the three localities (that are only about 50km apart) are nearly identical for both the autosomes and the sex chromosomes and the differences can probably be attributed to measuring errors.

Table 9.30. True and relative chromosome areas of *D. schoemani schoemani*.

True chromosome areas (μm^2) and standard deviation.				
Chromosome	**Baziya forest**	**Ku-manina forest**	**Nquaba forest**	**TOTAL**
Individuals	4	3	3	10
Cells	12	9	11	32
A1	2.20(±0.48)	2.38(±0.43)	2.49(±0.49)	2.35(±0.47)
A2	1.98(±0.39)	2.22(±0.42)	2.23(±0.46)	2.13(±0.43)
A3	1.93(±0.39)	2.07(±0.37)	2.17(±0.44)	2.05(±0.40)
A4	1.87(±0.38)	2.02(±0.39)	2.14(±0.43)	2.01(±0.40)
A5	1.82(±0.37)	1.97(±0.37)	2.05(±0.44)	1.94(±0.39)
A6	1.70(±0.33)	1.89(±0.35)	1.90(±0.34)	1.82(±0.34)
A7	1.66(±0.34)	1.82(±0.34)	1.87(±0.34)	1.78(±0.35)
A8	1.63(±0.34)	1.75(±0.30)	1.83(±0.33)	1.73(±0.33)
A9	1.58(±0.33)	1.69(±0.32)	1.79(±0.34)	1.68(±0.33)
A10	1.49(±0.27)	1.64(±0.29)	1.73(±0.30)	1.62(±0.30)
A11	1.44(±0.27)	1.60(±0.28)	1.65(±0.31)	1.56(±0.29)
A12	1.38(±0.26)	1.53(±0.29)	1.55(±0.30)	1.48(±0.29)
X	4.39(±0.86)	4.85(±0.88)	5.02(±1.05)	4.73(±0.95)
Y	3.49(±0.51)	3.99(±0.66)	4.26(±0.94)	3.90(±0.78)
Autosomes	20.69(±4.11)	22.58(±4.11)	23.39(±4.49)	22.15(±4.28)
All chromosomes	28.57(±5.41)	31.42(±5.61)	32.67(±6.44)	30.78(±5.93)
Relative chromosome areas (% of total area of autosomes) and standard deviation.				
A1	10.61(±0.44)	10.57(±0.45)	10.63(±0.42)	10.61(±0.42)
A2	9.59(±0.23)	9.81(±0.30)	9.51(±0.23)	9.62(±0.27)
A3	9.30(±0.20)	9.17(±0.22)	9.25(±0.21)	9.25(±0.21)
A4	9.06(±0.21)	8.95(±0.18)	9.12(±0.20)	9.05(±0.20)
A5	8.81(±0.25)	8.73(±0.17)	8.72(±0.30)	8.76(±0.25)
A6	8.24(±0.16)	8.34(±0.27)	8.14(±0.21)	8.24(±0.22)
A7	8.02(±0.16)	8.06(±0.27)	8.02(±0.21)	8.03(±0.21)
A8	7.85(±0.17)	7.77(±0.21)	7.82(±0.17)	7.82(±0.18)
A9	7.61(±0.14)	7.49(±0.19)	7.66(±0.16)	7.59(±0.17)
A10	7.24(±0.25)	7.27(±0.18)	7.41(±0.16)	7.31(±0.21)
A11	6.98(±0.20)	7.09(±0.23)	7.06(±0.22)	7.04(±0.21)
A12	6.69(±0.20)	6.75(±0.18)	6.65(±0.27)	6.69(±0.22)
X	21.23(±1.29)	21.50(±0.94)	21.41(±0.82)	21.37(±1.03)
Y	17.04(±1.29)	17.76(±1.06)	18.15(±0.96)	17.62(±1.19)

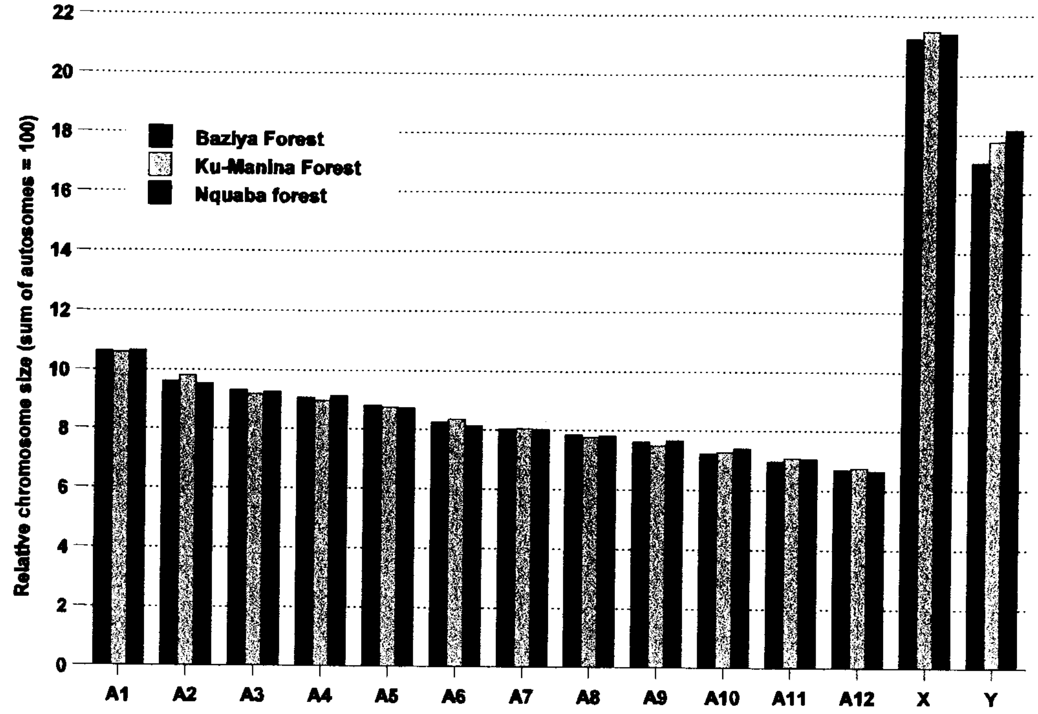


Figure 267. Idiogram of *Dundocoris schoemani schoemani*.

D. schoemani schoemani is the only 26XY *Dundocoris* species where A1 is not markedly larger than the rest of the autosomes. That, together with the fact that the two small chromosomes are not set apart as usual strongly indicates that it originated from a 28XY ancestor by the fusion of the two smallest autosomes. Its karyotype thus resemble that of the hypothetical 26XY ancestor of *Dundocoris* (refer to the discussion at 9.2.12).

9.2.7.2. *Dundocoris schoemani dwesaensis*. (Figs 268, 491-492).

The chromosome number of *D. schoemani dwesaensis* is 2n(♂) = 26XY. The true and relative chromosome areas are presented in Table 9.31 and an idiogram in Fig. 268.

A1 is about 1.32x as large as A2. Autosomes A2-A12 form a more or less gradual size series with definite steps between A2/A3 and A11/A12 and a small step between A10/A11. The sex chromosomes are the largest chromosomes in the complement: the X-chromosome is twice and the Y-chromosome about 1.47x as large as A2.

D. schoemani dwesaensis probably originated independently of *D. schoemani schoemani* from the same 28XY ancestor by means of the fusion of two of the smaller autosomes.

Table 9.31. True and relative chromosome areas of *D. schoemani dwesaensis*.

True chromosome areas (µm²) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	Dwesa forest	Dwesa forest
Individuals	1	1
Cells	6	6
A1	3.92(±0.24)	13.64(±0.33)
A2	2.98(±0.26)	10.35(±0.40)
A3	2.63(±0.20)	9.13(±0.25)
A4	2.58(±0.18)	8.98(±0.21)
A5	2.49(±0.18)	8.65(±0.22)
A6	2.40(±0.13)	8.35(±0.18)
A7	2.32(±0.15)	8.08(±0.26)
A8	2.25(±0.14)	7.84(±0.18)
A9	2.12(±0.06)	7.39(±0.28)
A10	1.95(±0.13)	6.79(±0.16)
A11	1.70(±0.13)	5.92(±0.44)
A12	1.41(±0.12)	8.89(±0.31)
X	5.94(±0.24)	20.75(±1.42)
Y	4.37(±0.32)	15.22(±1.19)
Autosomes	28.73(±1.68)	
All chromosomes	39.04(±1.81)	

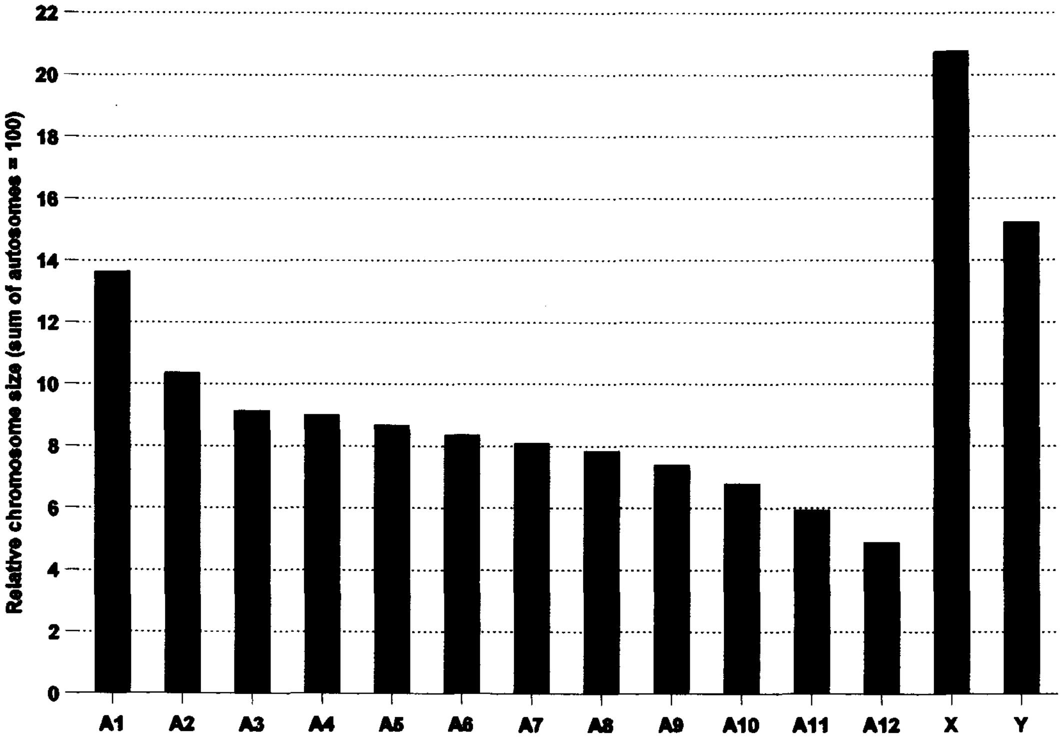


Figure 268. Idiogram of *Dundocoris schoemani dwesaensis*.

9.2.8. *Dundocoris scholtzi.* (Figs 269, 493-494).

The chromosome number of *D. scholtzi* is 2n(♂) = 26XY. The true and relative chromosome areas are presented in Table 9.32 and an idiogram in Fig. 269. A1 is distinctly larger than the rest of the autosomes (1.35x as large as A2). A2-A12 form a more or less gradual size series but a distinct step sets off the smallest two autosomes. The sex chromosomes are large: the X-chromosome is twice the size of A2 while the Y-chromosome is the same size as A1 (1.35x the size of A2).

Table 9.32. True and relative chromosome areas of *D. scholtzi.*

True chromosome areas (μm^2) and standard deviation.		**Relative chromosome areas (% of total area of autosomes) and standard deviation.**
Chromosome	**Ngome forest**	**Ngome forest**
Individuals	**2**	**2**
Cells	**4**	**4**
A1	**3.86(±0.46)**	**13.06(±0.48)**
A2	**2.87(±0.37)**	**9.69(±0.39)**
A3	**2.70(±0.33)**	**9.13(±0.21)**
A4	**2.60(±0.28)**	**8.79(±0.18)**
A5	**2.56(±0.25)**	**8.68(±0.17)**
A6	**2.48(±0.31)**	**8.37(±0.19)**
A7	**2.44(±0.31)**	**8.23(±0.23)**
A8	**2.35(±0.28)**	**7.94(±0.29)**
A9	**2.19(±0.19)**	**7.41(±0.30)**
A10	**2.14(±0.22)**	**7.22(±0.28)**
A11	**1.75(±0.12)**	**5.92(±0.36)**
A12	**1.64(±0.14)**	**5.57(±0.23)**
X	**5.84(±1.09)**	**19.72(±2.19)**
Y	**3.90(±0.68)**	**13.14(±1.08)**
Autosomes	**29.60(±3.13)**	
All chromosomes	**39.34(±4.71)**	

D. scholtzi probably originated from a 28XY ancestor by the fusion of two autosomes. The definite size step between A10 and the smallest two autosomes suggests that A9 and A10 of the ancestor were possibly involved in this fusion.

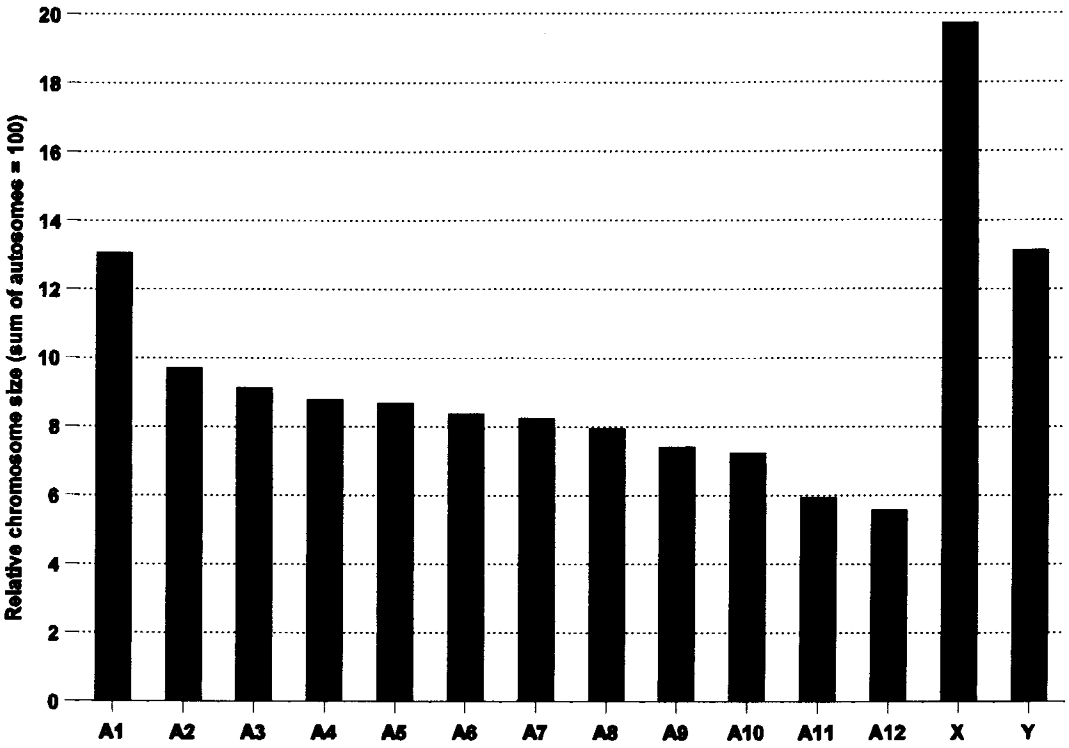


Figure 269. Idiogram of *Dundocoris scholtzi*.

One of the 16 individuals that were cytogenetically studied has an aberrant chromosome number of 2n(♂) = $25X_1X_2Y$. This also proved to be a neo-X_1X_2Y sex chromosome system that originated by the fusion of the largest autosome with the Y-chromosome. The autosomal part of the neo-Y remained euchromatic and underwent normal synapsis and crossovers with the neo-X (X_2).

It is unknown if this individual alone has this fusion or if it perhaps belongs to a sub-population where it has become fixed. I collected the specimens I used for cytogenetic studies from various localities in the large Ngome Forest and was unable to keep track of the exact spot where each individual was collected. This individual, however, shows that sex chromosome polymorphism does occur in natural populations.

9.2.9. ***Dundocoris fuscus.*** (Figs 270, 495-496).

The chromosome number of *D. fuscus* is 2n(♂) = 28XY. The true and relative chromosome areas are presented in Table 9.33 and an idiogram in Fig. 270. *D. fuscus* possesses the typical ancestral *Dundocoris* karyotype. The autosomes form a gradual size series with small steps between A1/A2, A11/A12 and A12/A13. The sex chromosomes are the largest chromosomes in the complement but in comparison with those of the other *Dundocoris* species they are relatively small: the X-chromosome is about 1.34x and the Y-chromosome 1.25x as large as the largest autosome.

Table 9.33. True and relative chromosome areas of *D. fuscus.*

True chromosome areas (μm^2) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Mariepskop forest**	**Mariepskop forest**
Individuals	**2**	**2**
Cells	**8**	**8**
A1	**2.76(±0.20)**	**10.05(±0.50)**
A2	**2.52(±0.18)**	**9.17(±0.24)**
A3	**2.42(±0.16)**	**8.82(±0.34)**
A4	**2.33(±0.14)**	**8.49(±0.19)**
A5	**2.26(±0.14)**	**8.20(±0.28)**
A6	**2.20(±0.12)**	**8.00(±0.27)**
A7	**2.15(±0.14)**	**7.80(±0.18)**
A8	**2.08(±0.15)**	**7.56(±0.18)**
A9	**2.01(±0.15)**	**7.30(±0.22)**
A10	**1.93(±0.17)**	**7.01(±0.29)**
A11	**1.83(±0.16)**	**6.65(±0.29)**
A12	**1.60(±0.11)**	**5.83(±0.41)**
A13	**1.41(±0.14)**	**5.12(±0.45)**
X	**3.70(±0.25)**	**13.46(±0.29)**
Y	**3.47(±0.26)**	**12.62(±0.50)**
Autosomes	**27.51(±1.62)**	
All chromosomes	**34.68(±2.10)**	

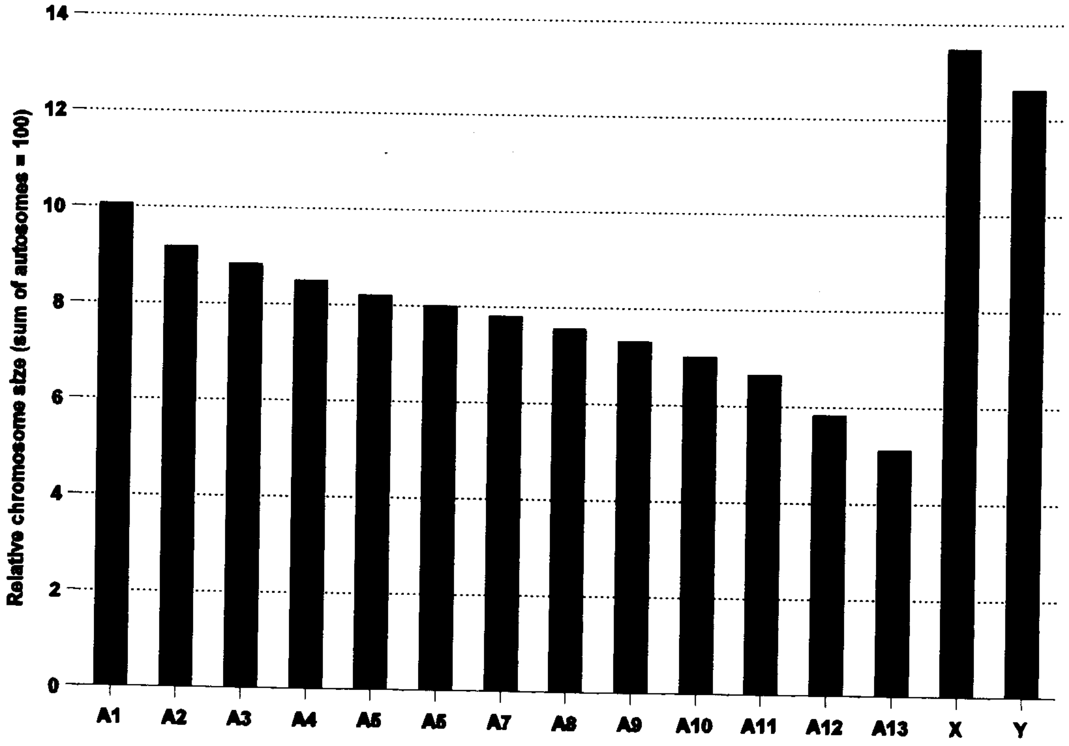


Figure 270. Idiogram of *Dundocoris fuscus.*

9.2.10. *Dundocoris callani.* (Figs 271-272, 497-503).

D. callani is a very variable species that is widespread in the forests of Kwazulu-Natal and the Eastern Cape. Two subspecies are currently recognised but it is possible that the nominate subspecies actually consists of an assemblage of sibling species. The chromosome number of the nominate subspecies is 2n(♂) = 28XY while that of *D. callani noduliclypeatus* is 2n(♂) = 26XY.

Table 9.34. True and relative chromosome areas of *D. callani callani*.

True chromosome areas (μm^2) and standard deviation.				
Chromosome	**Ngoye forest**	**Nquaba forest**	**Scottburgh**	**TOTAL**
Individuals	2	2	1	5
Cells	10	8	7	25
A1	2.37(±0.39)	3.46(±0.74)	2.69(±0.50)	2.81(±0.70)
A2	2.27(±0.38)	3.23(±0.63)	2.53(±0.55)	2.65(±0.64)
A3	2.18(±0.33)	3.14(±0.62)	2.47(±0.53)	2.57(±0.63)
A4	2.04(±0.31)	3.00(±0.57)	2.37(±0.44)	2.44(±0.59)
A5	1.96(±0.32)	2.94(±0.56)	2.22(±0.47)	2.35(±0.60)
A6	1.93(±0.32)	2.87(±0.55)	2.15(±0.43)	2.29(±0.58)
A7	1.88(±0.33)	2.78(±0.51)	2.11(±0.40)	2.23(±0.55)
A8	1.85(±0.29)	2.69(±0.50)	2.02(±0.41)	2.17(±0.53)
A9	1.81(±0.31)	2.59(±0.46)	1.98(±0.39)	2.11(±0.49)
A10	1.76(±0.27)	2.48(±0.45)	1.89(±0.35)	2.02(±0.46)
A11	1.64(±0.24)	2.34(±0.39)	1.84(±0.37)	1.92(±0.43)
A12	1.40(±0.24)	1.98(±0.38)	1.46(±0.28)	1.60(±0.38)
A13	1.32(±0.22)	1.84(±0.29)	1.34(±0.23)	1.49(±0.33)
X	7.59(±1.29)	5.86(±1.03)	5.32(±0.98)	6.40(±1.48)
Y	6.00(±0.96)	3.05(±0.60)	4.30(±0.90)	4.58(±1.51)
Autosomes	24.42(±3.37)	35.35(±6.55)	27.07(±5.30)	28.66(±6.85)
All chromosomes	38.00(±5.48)	44.27(±8.13)	36.69(±7.14)	39.64(±7.35)
Relative chromosome areas (% of total area of autosomes) and standard deviation.				
A1	9.71(±0.35)	9.75(±0.42)	9.97(±0.20)	9.80(±0.35)
A2	9.30(±0.19)	9.13(±0.27)	9.33(±0.28)	9.26(±0.25)
A3	8.92(±0.17)	8.88(±0.31)	9.10(±0.26)	8.96(±0.25)
A4	8.36(±0.22)	8.50(±0.11)	8.76(±0.18)	8.52(±0.24)
A5	8.04(±0.09)	8.31(±0.12)	8.18(±0.25)	8.17(±0.19)
A6	7.89(±0.11)	8.11(±0.14)	7.94(±0.19)	7.98(±0.17)
A7	7.70(±0.12)	7.88(±0.13)	7.80(±0.16)	7.79(±0.15)
A8	7.57(±0.12)	7.61(±0.14)	7.46(±0.10)	7.55(±0.13)
A9	7.41(±0.20)	7.35(±0.18)	7.33(±0.11)	7.37(±0.17)
A10	7.21(±0.22)	7.02(±0.12)	6.98(±0.18)	7.08(±0.20)
A11	6.74(±0.38)	6.61(±0.42)	6.81(±0.20)	6.72(±0.35)
A12	5.74(±0.22)	5.61(±0.19)	5.38(±0.23)	5.60(±0.25)
A13	5.40(±0.18)	5.24(±0.36)	4.97(±0.19)	5.23(±0.30)
X	31.08(±1.66)	16.64(±0.58)	19.70(±0.53)	23.27(±6.71)
Y	24.62(±1.66)	8.63(±0.55)	15.90(±0.99)	17.06(±7.02)

9.2.10.1. *Dundocoris callani callani.* (Figs 271, 497-501).

The chromosome number of *D. callani callani* is 2n(♂) = 28XY. The true and relative chromosome areas for three localities are presented in Table 9.34 and idiograms for the three localities in Fig. 271. *D. callani callani* exhibits the typical ancestral *Dundocoris* karyotype. The autosomal karyotypes of all three populations are very similar - the autosomes form a gradual size series but the smallest two (A12 & A13) are set apart by a slight step in the series. The sex chromosomes, however, differ markedly between the populations: In the Ngoye Forest population the sex chromosomes are very large, the X-chromosome is about 3.2x and the Y-chromosome about 2.5x the size of the largest autosome; in the Scottburgh population they are much smaller, the X being about 2x and the Y 1.6x as large as the largest autosome; in the Nquaba Forest population they are still smaller and there is a big difference between the sizes of the X and Y - the X is about 1.7x the size of the largest autosome while the Y is smaller than the largest autosome, about the same size as A4.

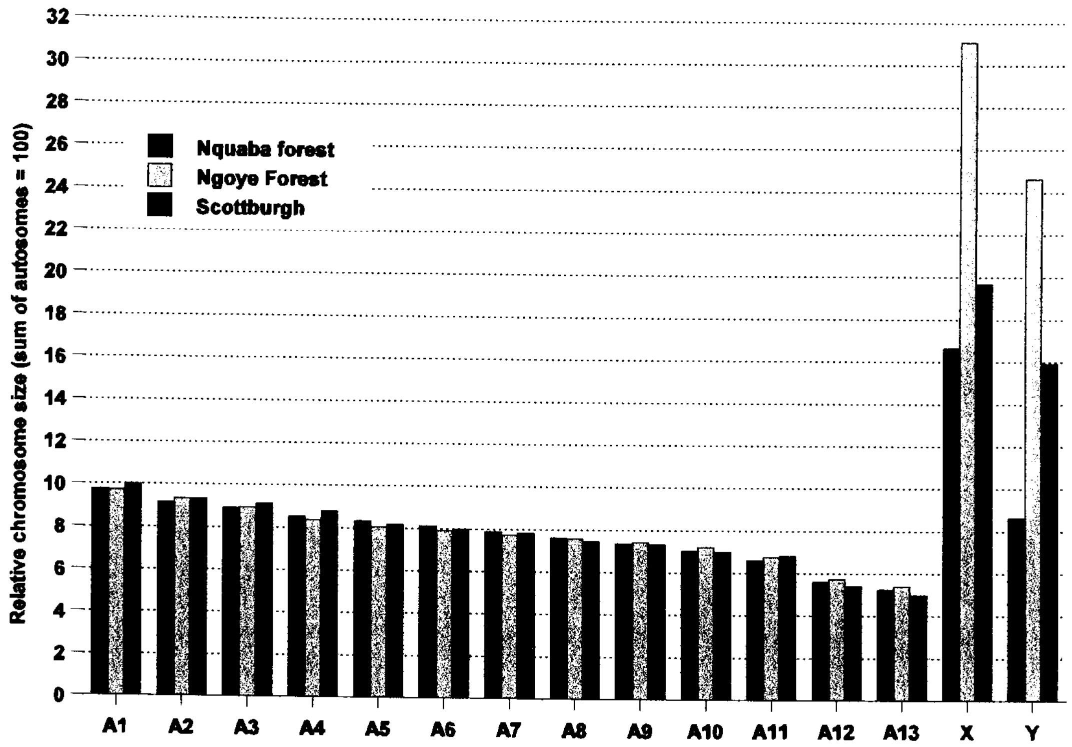


Figure 271. Idiogram of Dundocoris callani callani Hoberlandt.

9.2.10.2. *Dundocoris callani noduliclypeatus.* (Figs 272, 502-503).

The chromosome number of *D. callani noduliclypeatus* is 2n(♂) = 26XY. The true and relative chromosome areas are presented in Table 9.35 and an idiogram in Fig. 272. A1 is much (1.73x) larger than A2. Autosomes A2-A12 form a gradual size series but the smallest two autosomes are set apart by a slight step in the series. The sex chromosomes are very large: the X-chromosome is 2.7x and the Y-chromosome about 2.3x the size of A2.

Table 9.35. True and relative chromosome areas of *D. callani noduliclypeatus*.

True chromosome areas (μm²) and standard deviation.		Relative chromosome areas (% of total area of autosomes) and standard deviation.
Chromosome	**Town Bush**	**Town Bush**
Individuals	**1**	**1**
Cells	**5**	**5**
A1	**4.77(±0.41)**	**16.26(±0.68)**
A2	**2.76(±0.34)**	**9.38(±0.23)**
A3	**2.66(±0.36)**	**9.01(±0.34)**
A4	**2.53(±0.28)**	**8.59(±0.09)**
A5	**2.45(±0.28)**	**8.32(±0.23)**
A6	**2.38(±0.28)**	**8.06(±0.23)**
A7	**2.30(±0.27)**	**7.79(±0.22)**
A8	**2.20(±0.23)**	**7.49(±0.16)**
A9	**2.15(±0.24)**	**7.31(±0.18)**
A10	**1.99(±0.23)**	**6.75(±0.18)**
A11	**1.71(±0.22)**	**5.78(±0.30)**
A12	**1.55(±0.21)**	**5.26(±0.29)**
X	**7.46(±1.05)**	**25.35(±1.49)**
Y	**6.26(±0.74)**	**21.34(±1.77)**
Autosomes	**29.45(±3.23)**	
All chromosomes	**43.17(±4.82)**	

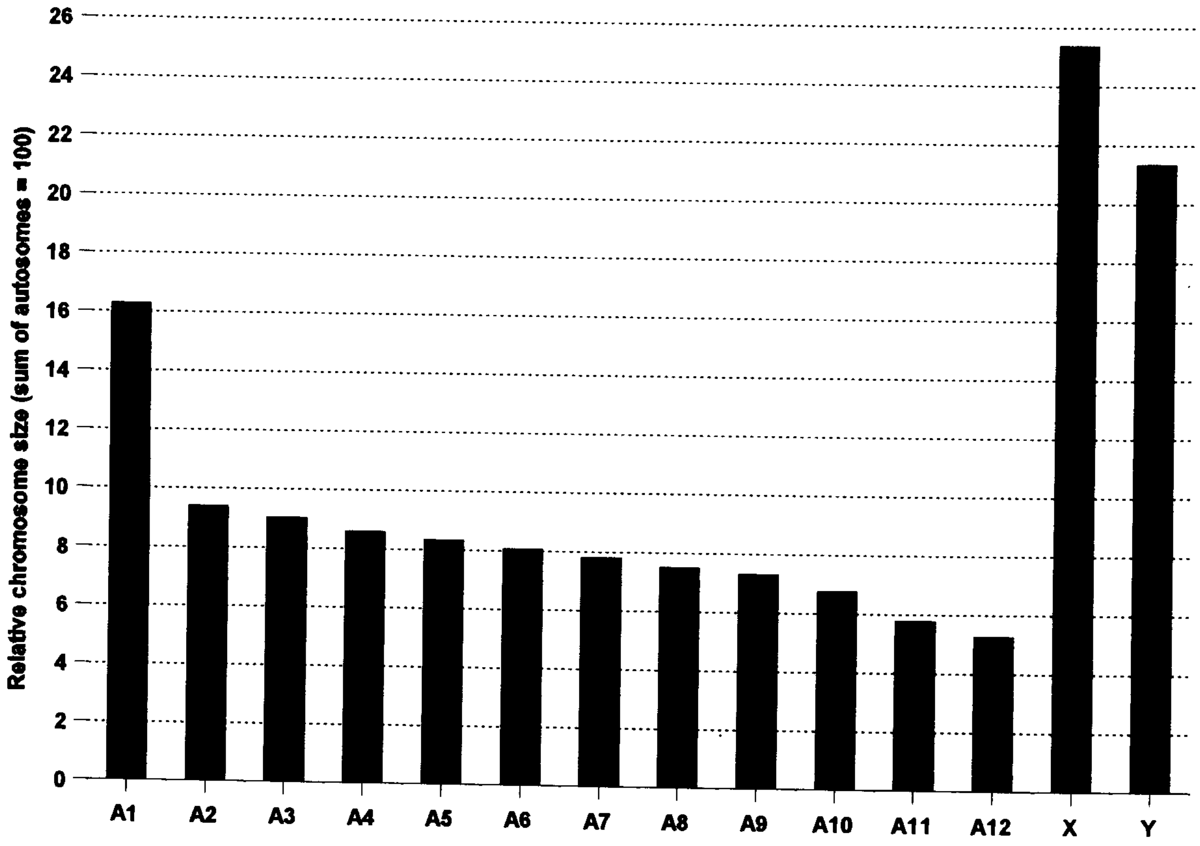


Figure 272. Idiogram of *Dundocoris callani noduliclypeatus*.

D. callani noduliclypeatus probably originated from *D. callani callani* by the fusion of two autosomes. The relatively small size of A2 in *D. callani noduliclypeatus* suggests that probably A1 and one of the smaller autosomes (but not A12 orA13) were involved.

9.2.11. ***Dundocoris natalensis.*** (Figs 273, 504-505).

The chromosome number of *D. natalensis* is 2n(♂) = 28XY. The true and relative chromosome areas for two localities are presented in Table 9.36 and idiograms for the two localities in Fig. 273. *D. natalensis* also has the typical *Dundocoris* karyotype. The karyotypes of the populations from the two localities are very similar in respect of both the autosomes and sex chromosomes. The autosomes form the usual gradual series with the two smallest chromosomes set apart by a small step in the series. The sex chromosomes are large, the X-chromosome is about twice and the Y-chromosome about 1.47x the size of the largest autosome.

Table 9.36. True and relative chromosome areas of *D. natalensis*.

	True chromosome areas (µm²) and standard deviation.			**Relative chromosome areas (% of total area of autosomes) and standard deviation.**		
Chromosome	**Hawaan forest**	**Ngoye forest**	**TOTAL**	**Hawaan forest**	**Ngoye forest**	**TOTAL**
Individuals	**2**	**2**	**4**	**2**	**2**	**4**
Cells	**15**	**11**	**26**	**15**	**11**	**26**
A1	**3.28(±0.65)**	**2.95(±0.72)**	**3.14(±0.68)**	**9.74(±0.31)**	**9.98(±0.46)**	**9.85(±0.39)**
A2	**3.02(±0.52)**	**2.78(±0.72)**	**2.92(±0.61)**	**9.01(±0.24)**	**9.39(±0.43)**	**9.17(±0.38)**
A3	**2.92(±0.54)**	**2.58(±0.62)**	**2.77(±0.59)**	**8.69(±0.17)**	**8.73(±0.14)**	**8.70(±0.16)**
A4	**2.83(±0.54)**	**2.47(±0.63)**	**2.68(±0.59)**	**8.42(±0.19)**	**8.35(±0.24)**	**8.39(±0.21)**
A5	**2.73(±0.49)**	**2.43(±0.61)**	**2.60(±0.56)**	**8.14(±0.15)**	**8.20(±0.21)**	**8.16(±0.18)**
A6	**2.69(±0.50)**	**2.31(±0.53)**	**2.53(±0.54)**	**7.99(±0.14)**	**7.85(±0.18)**	**7.93(±0.17)**
A7	**2.64(±0.50)**	**2.26(±0.53)**	**2.48(±0.53)**	**7.84(±0.13)**	**7.67(±0.13)**	**7.77(±0.15)**
A8	**2.58(±0.49)**	**2.21(±0.52)**	**2.42(±0.53)**	**7.66(±0.14)**	**7.50(±0.16)**	**7.59(±0.17)**
A9	**2.52(±0.48)**	**2.17(±0.52)**	**2.38(±0.52)**	**7.50(±0.14)**	**7.37(±0.16)**	**7.44(±0.16)**
A10	**2.38(±0.45)**	**2.10(±0.48)**	**2.27(±0.48)**	**7.09(±0.24)**	**7.14(±0.20)**	**7.12(±0.22)**
A11	**2.22(±0.42)**	**2.02(±0.46)**	**2.13(±0.44)**	**6.60(±0.29)**	**6.85(±0.26)**	**6.71(±0.30)**
A12	**1.96(±0.34)**	**1.66(±0.40)**	**1.83(±0.39)**	**5.84(±0.23)**	**5.64(±0.38)**	**5.76(±0.31)**
A13	**1.84(±0.33)**	**1.58(±0.41)**	**1.73(±0.38)**	**5.47(±0.19)**	**5.32(±0.32)**	**5.41(±0.26)**
X	**6.78(±1.20)**	**5.64(±1.57)**	**6.30(±1.46)**	**20.22(±1.08)**	**18.96(±1.17)**	**19.69(±1.27)**
Y	**4.85(±0.92)**	**4.33(±1.18)**	**4.63(±1.05)**	**14.43(±0.85)**	**14.60(±1.03)**	**14.50(±0.91)**
Autosomes	**33.61(±6.20)**	**29.52(±7.07)**	**31.88(±6.76)**			
All chromosomes	**45.24(±8.25)**	**39.50(±9.77)**	**42.81(±9.20)**			

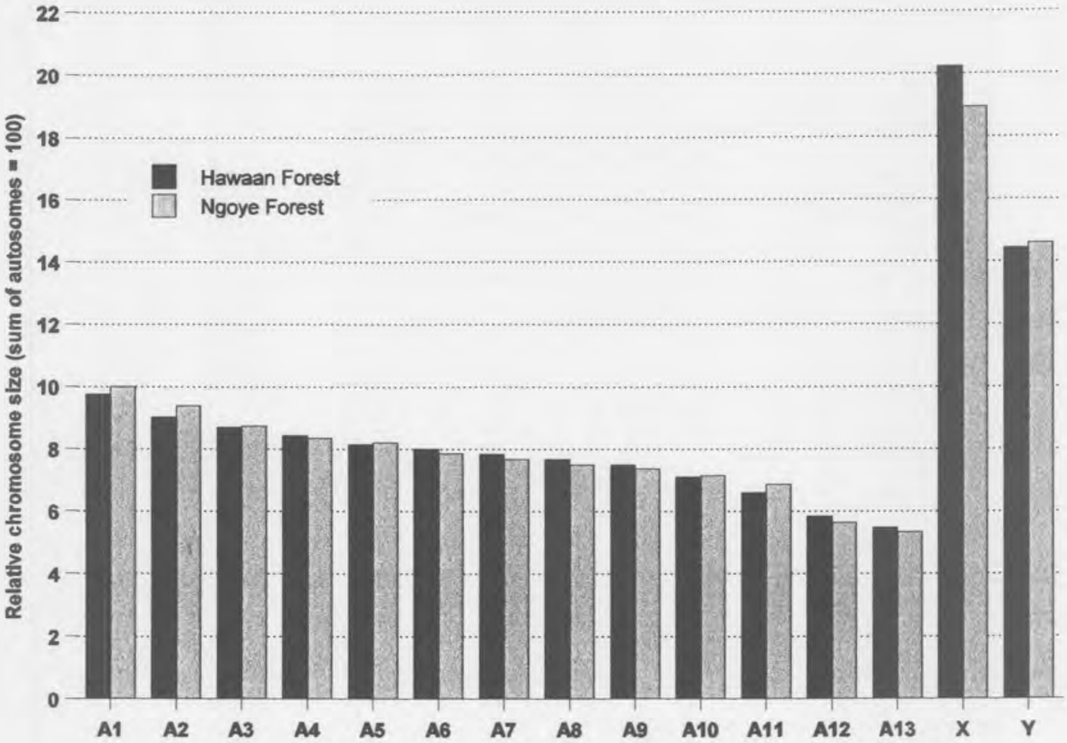


Figure 273. Idiogram of *Dundocoris natalensis Kormilev*.

9.2.12. Discussion.

Most *Dundocoris* taxa have a chromosome number of 2n(♂) = 26XY or 28XY. In an effort to determine which is the ancestral number for the genus the six taxa with 28XY were compared (Fig. 273A) as well as the six taxa with 26XY (Fig. 273B). The autosomal karyotypes of all the 28XY taxa are very similar - the autosomes form a gradual size series with the two smallest chromosomes set apart by a small step. The autosomal karyotypes of the 26XY taxa, however, differ markedly from one another, mainly in respect of the size of the largest chromosome. This strongly indicates that 28XY is the ancestral chromosome number for *Dundocoris* and that all the 26XY taxa originated independently from 28XY ancestors by the fusions of different combinations of autosomes. This notion is further supported by the fact that the taxa that are widespread (*D. callani callani*, *D. flavilineatus flavilineatus* and *D. natalensis*) exhibit a 28XY chromosome number. Most of the 26XY taxa have a limited distribution and often seem to occur only in a single forest like *D. scholtzi* and *D. begemanni* or group of nearby forests as *D. schoemani schoemani*, *D. schoemani dwesaensis*, *D. stuckenbergi stuckenbergi* and *D. callani noduliclypeatus*. The sex chromosomes of both the 28XY and 26XY taxa vary greatly in size but they are usually large: the X-chromosome is always the largest chromosome in the complement and the Y-chromosome usually the second largest. There exists thus, little doubt that 2n(♂) = 28XY is the ancestral chromosome number of *Dundocoris*.

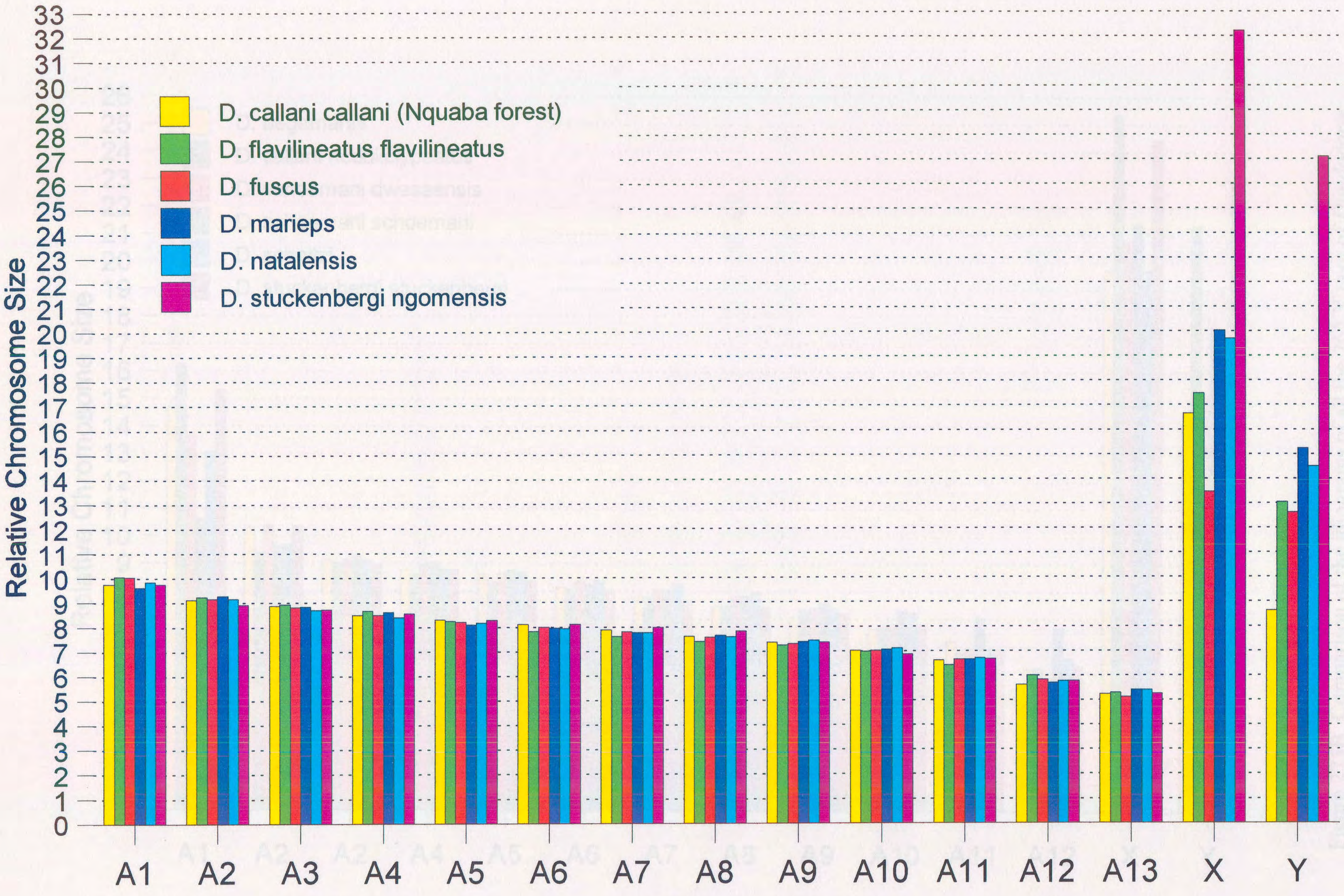


Figure 273A. Comparison of the idiograms of all the 28XY taxa of *Dundocoris*.

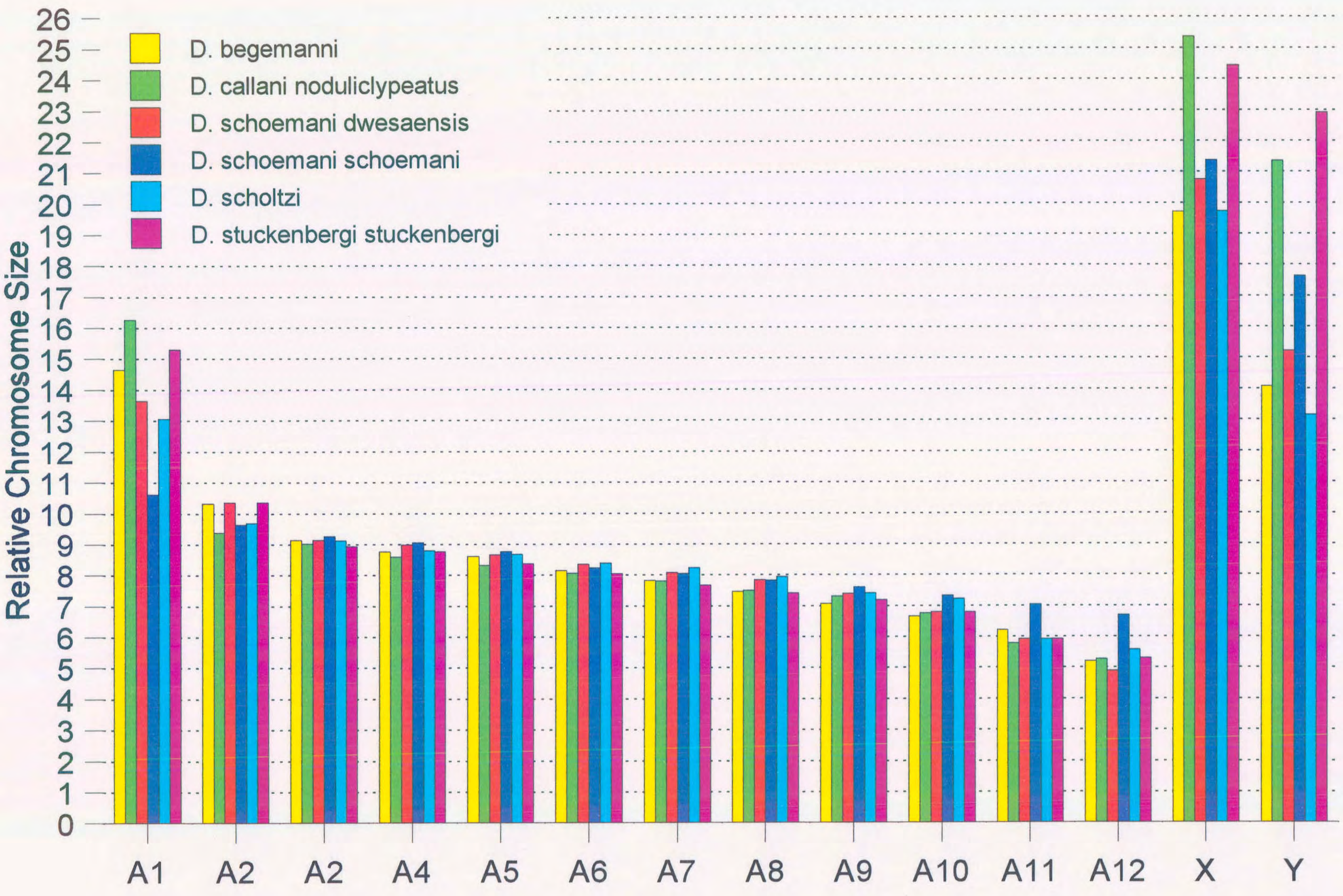


Figure 273B. Comparison of the idiograms of all the 26XY taxa of *Dundocoris.*

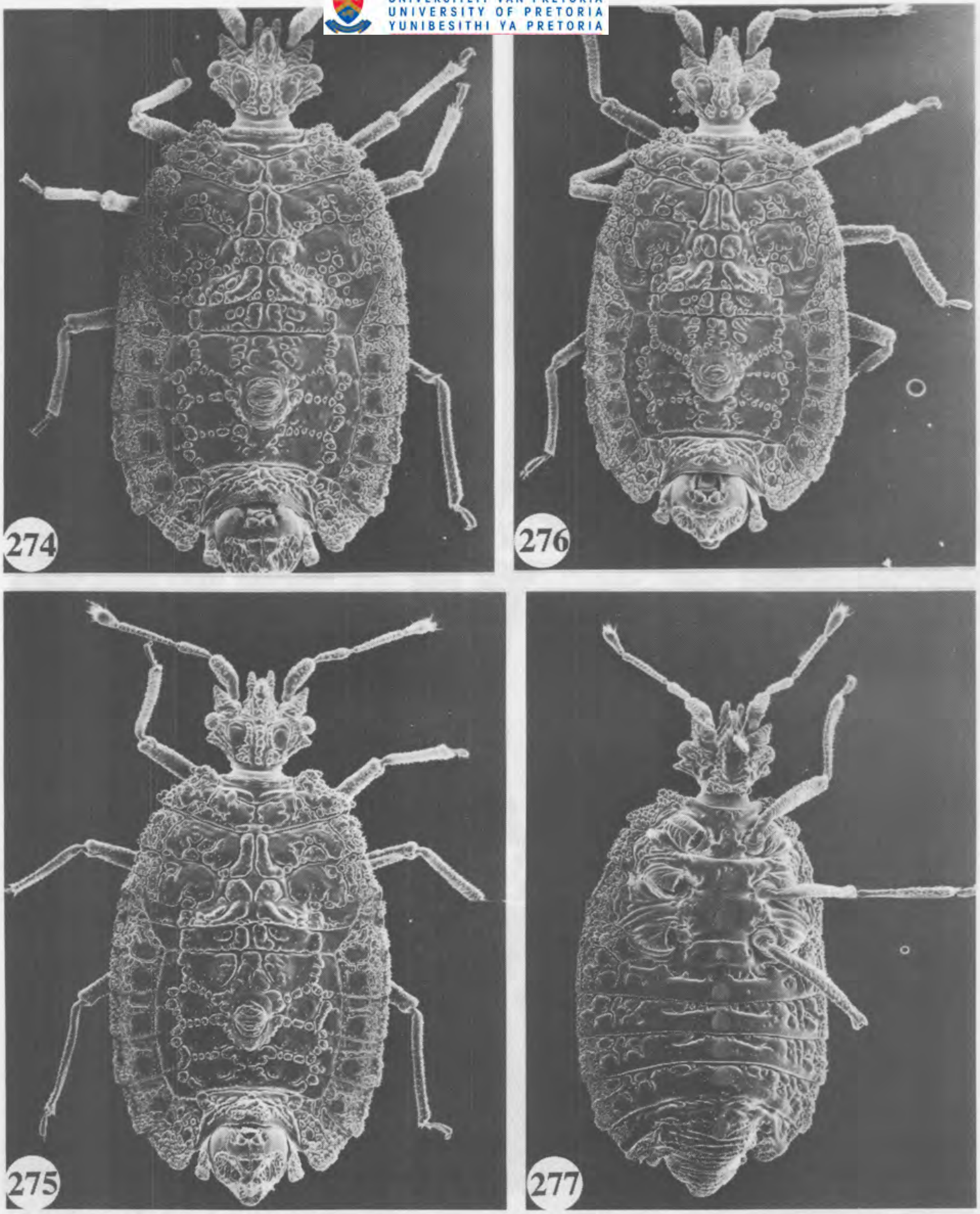
The ancestral 28XY karyotype of *Dundocoris* can be characterized as follows:

1. The autosomes form a more or less gradual size series.
2. The two smallest autosomes (A12 & A13) are set apart by a slightly larger step in the size series.
3. The sex chromosomes are the largest chromosomes in the complement - the X-chromosome is usually about twice and the Y-chromosome about 1.4x the size of the largest autosome.

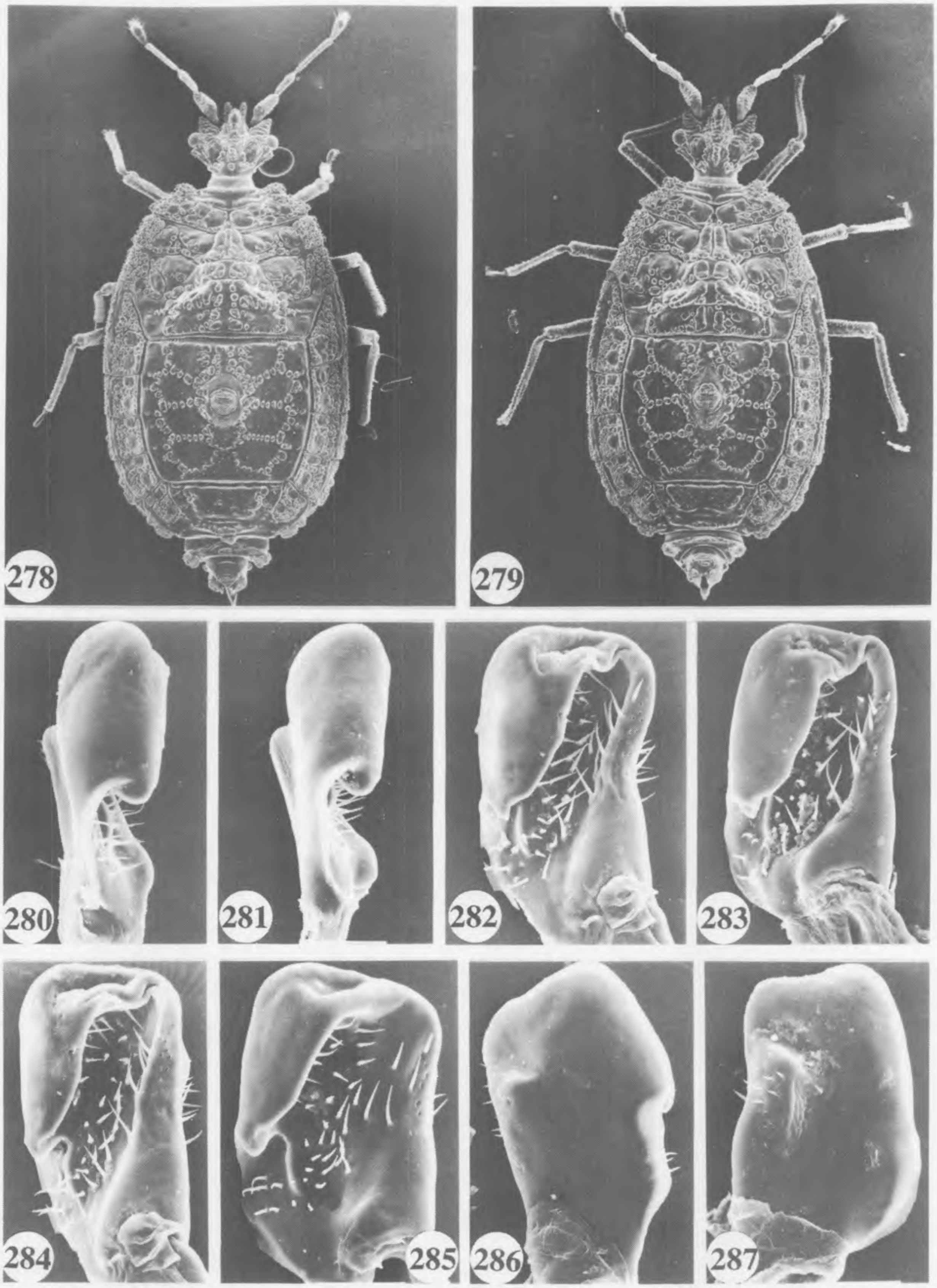
If we accept that 2n(♂) = 14XY is the ancestral chromosome number of the Aradidae and also for the Carventinae (as genera like *Silvacoris*, *Adamanotus* and *Spiculanotus* indicate) then the 28XY karyotype of *Dundocoris* must have evolved from a 14XY karyotype. This probably happened only once in the way proposed for *Trichocarventus* (refer to discussion at 7.2.3) and it demonstrates a relationship between the genera *Trichocarventus*, *Miteronotus* and *Dundocoris*. The karyotype of *D. schoemani schoemani* is of particular interest as it represents the karyotype of the hypothetical 26XY predecessor of the 28XY archetype of the three genera. It is, however, clear that this resemblance is secondary and originated by the fusion of the same autosomes that originally fragmented to form the 28XY archetype.

In the karyotype evolution within the genus *Dundocoris* many chromosome fusions took place (there is evidence for 23 fusions in the above taxa) while there is no indication of any fissions. It is evident that fusions played a very important role in the karyotype evolution of *Dundocoris* while fragmentations did not seem to have played any role at all. This is contrary to what has been generally postulated for the Hetroptera. Ueshima (1979) for example stated: "The possibility that fusion also occurs in organisms with holocentric chromosomes has been discussed by many workers. If indeed it does occur, and the evidence is far from convincing, there can be no doubt that fusion takes place relatively rarely in comparison with fragmentation." Thomas (1987) rightfully criticises the emphasis that Ueshima and others placed on fragmentation and suggested that other processes like fusions, simple aneuploidy and even polyploidy may also have played an important role in the chromosomal evolution in the Heteroptera.

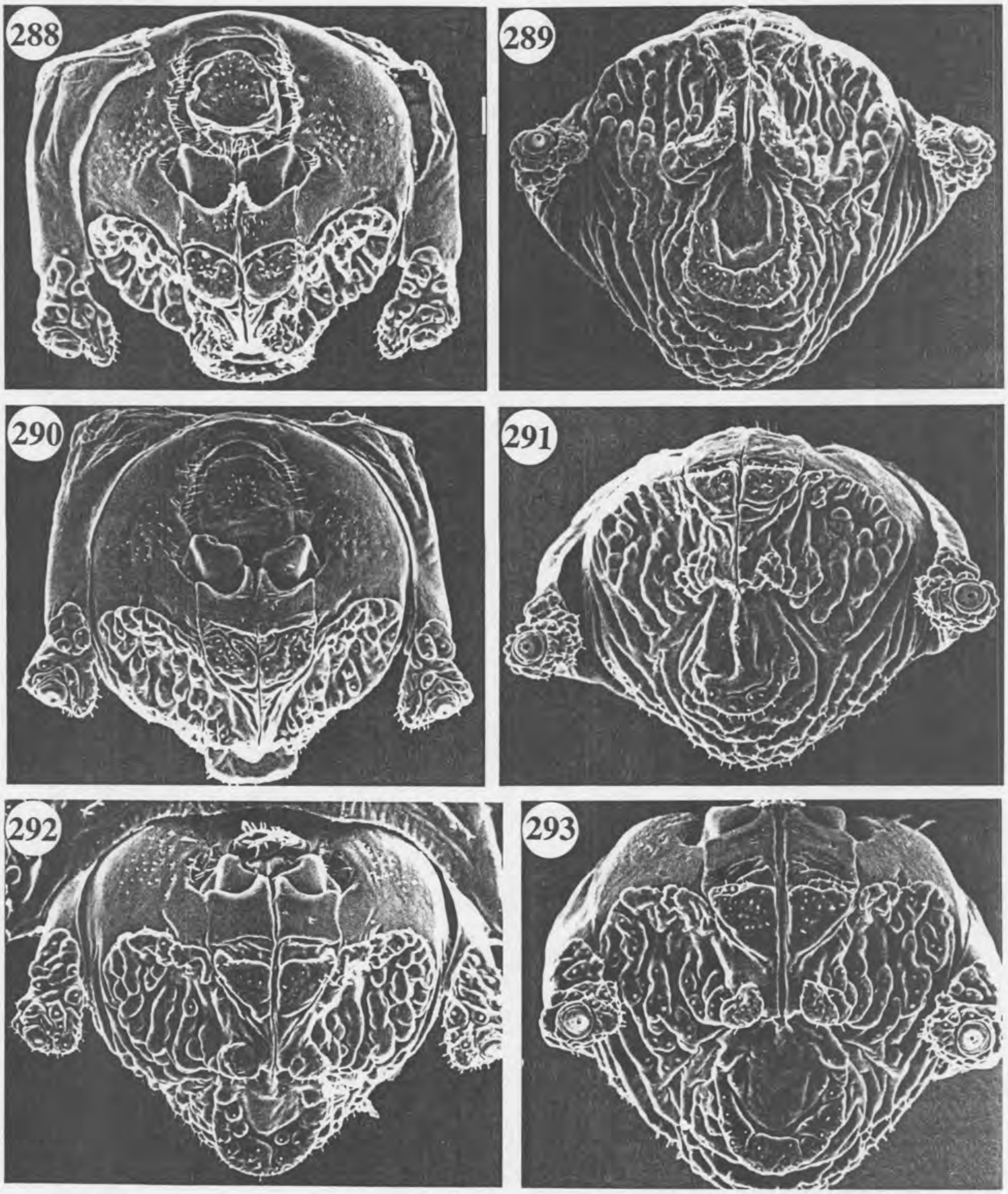
Not only did fusions play such an important role in the evolution of *Dundocoris* but three taxa feature multiple sex chromosome systems that originated by autosome-sex chromosome fusions. At present these are the only known cases in the Heteroptera where that has happened. The case of *D. scholtzi* where one out of sixteen studied individuals has an autosome-Y-chromosome fusion indicates that such fusions may be more common than realized and perhaps happen regularly but very infrequently become fixed in populations.



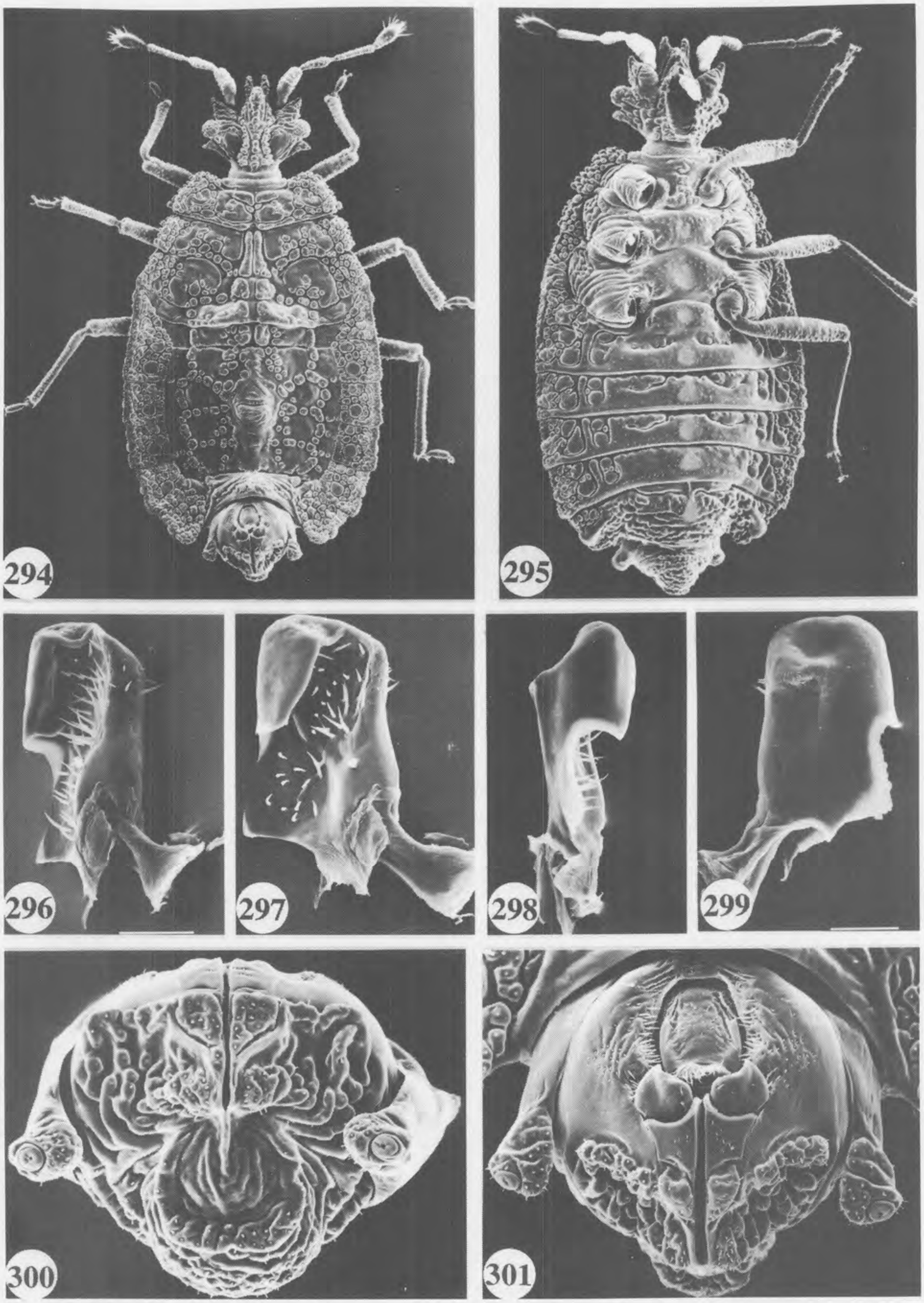
Figs 274-277. Scanning electron photomicrographs of the subspecies of *Dundocoris nodulicarinus* **spec. nov.** 274. *D. nodulicarinus nodulicarinus* **spec. nov.**, dorsal aspect of male paratype. 275. *D. nodulicarinus septeni* **spec. et subspec. nov.**, dorsal aspect of male paratype. 276-277. *D. nodulicarinus novenus* **spec. et subspec. nov.** 276. Dorsal aspect of male paratype. 277. Ventral aspect of male paratype.



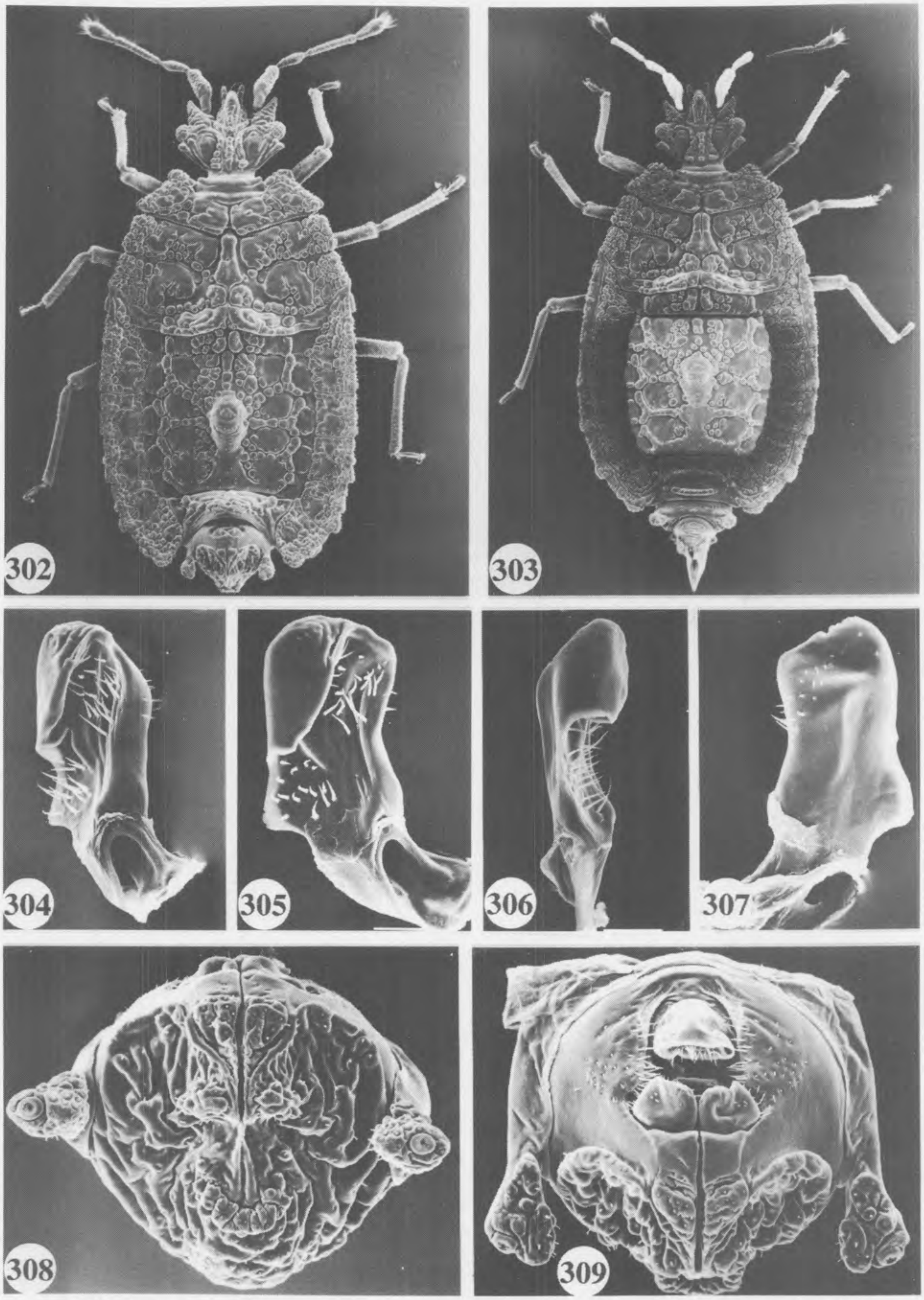
Figs 278-287. Scanning electron photomicrographs of the subspecies of *Dundocoris nodulicarinus* **spec. nov.** 278. *D. nodulicarinus nodulicarinus* **spec. nov.**, dorsal aspect of female paratype. 279. *D. nodulicarinus novenus* **spec. et subspec. nov.**, dorsal aspect of female paratype. 280-287. Different aspects of the left parameres of males (scale bar = 50 μm). 282 & 284. *D. nodulicarinus nodulicarinus* **spec. nov.** 281, 283 & 287. *D. nodulicarinus novenus* **spec. et subspec. nov.** 280, 285-286. *D. nodulicarinus septeni* **spec. et subspec. nov.**



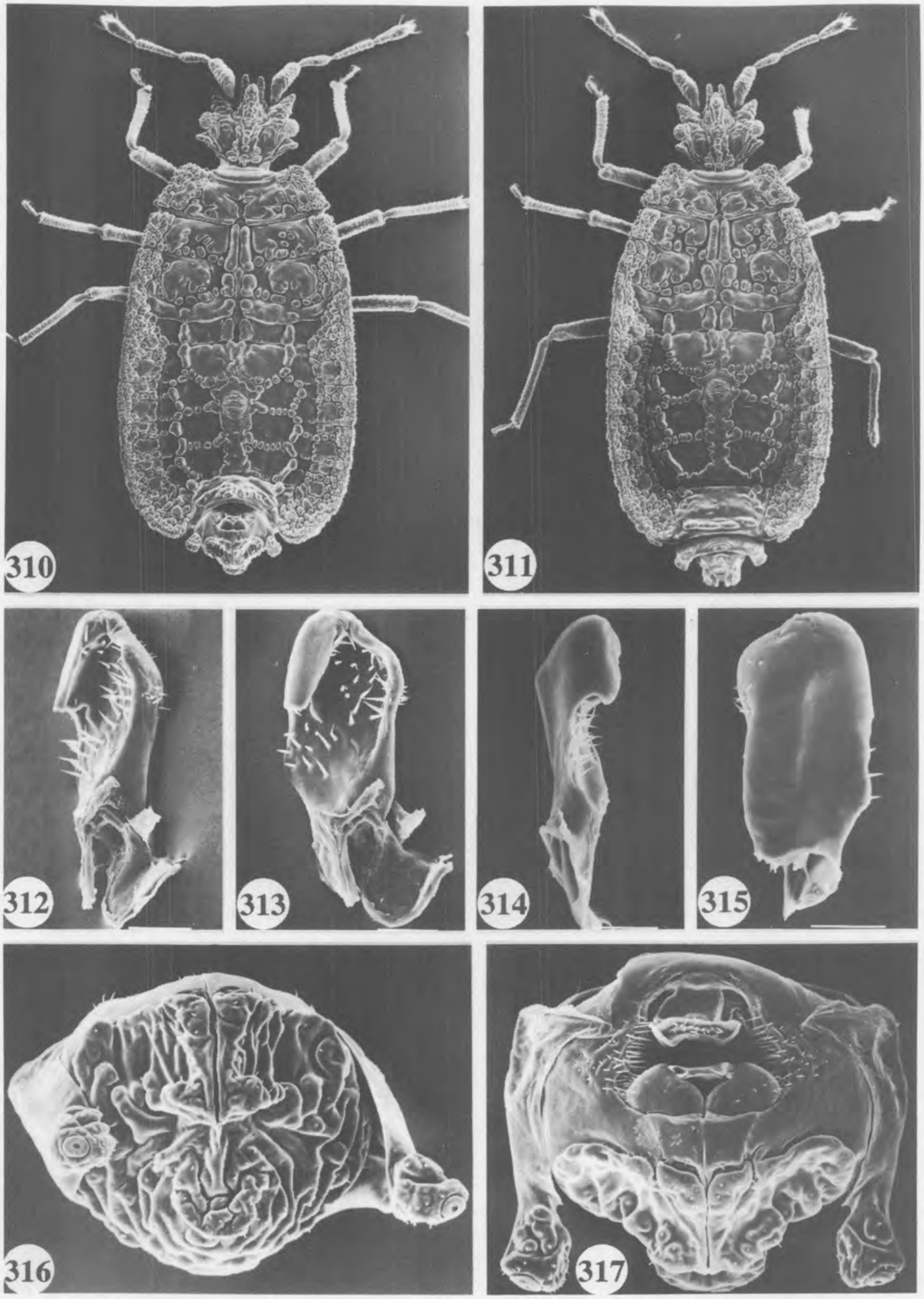
Figs 288-293. Scanning electron photomicrographs of the pygophores of the subspecies of *Dundocoris nodulicarinus* **spec. nov.** 288-289. *D. nodulicarinus nodulicarinus* **spec. nov.** 288. Dorsal aspect (scale bar = 50 μm). 289. Caudal aspect. 290-291. *D. nodulicarinus novenus* **spec. et subspec. nov.** 290. Dorsal aspect. 291. Caudal aspect. 292-293. *D. nodulicarinus septeni* **spec. et subspec. nov.** 292. Dorsal aspect. 293. Caudal aspect.



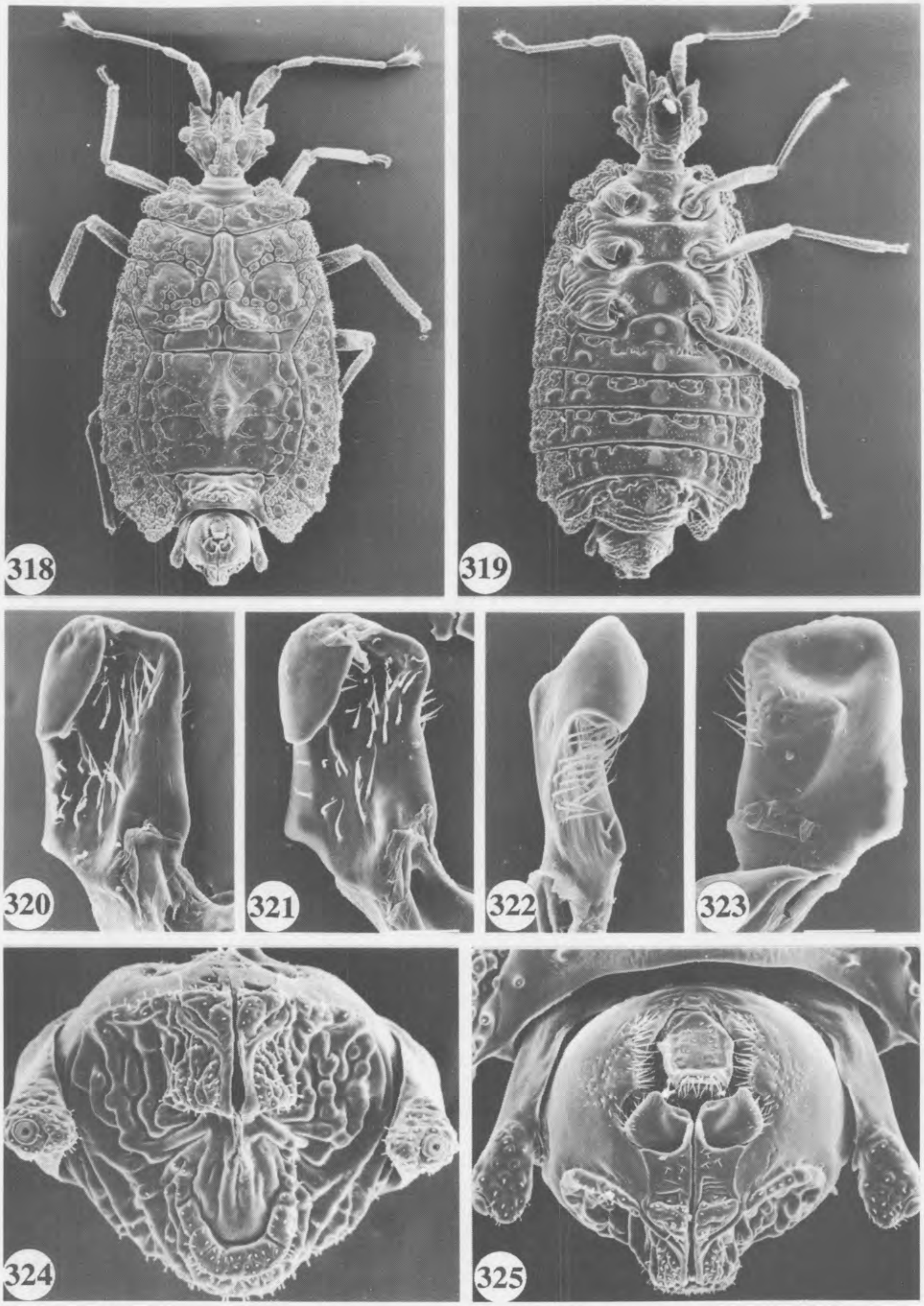
Figs 294-301. Scanning electron photomicrographs of *Dundocoris transvaalensis* **spec. nov.** 294-295. Male paratype. 294. Dorsal aspect. 295. Ventral aspect. 296-299. Different aspects of the left paramere (scale bar = 50 μm). 300-301. Pygophore. 300. Caudal aspect. 301. Dorsal aspect.



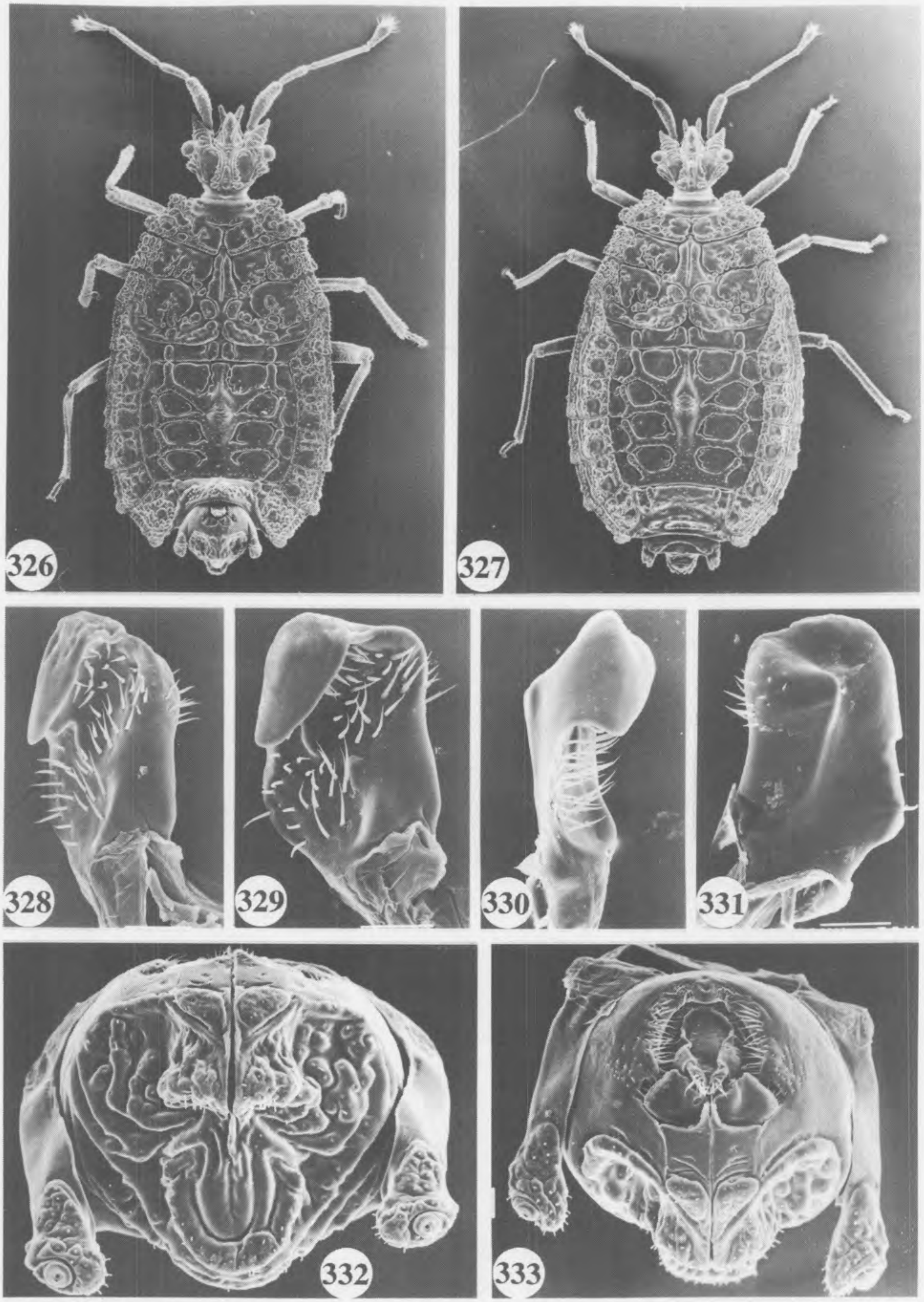
Figs 302-309. Scanning electron photomicrographs of *Dundocoris marieps* **spec. nov.** 302. Male paratype, dorsal aspect. 303. Female paratype, dorsal aspect. 304-307. Different aspects of the left paramere (scale bar = 50 μm). 308-309. Pygophore. 308. Caudal aspect. 309. Dorsal aspect.



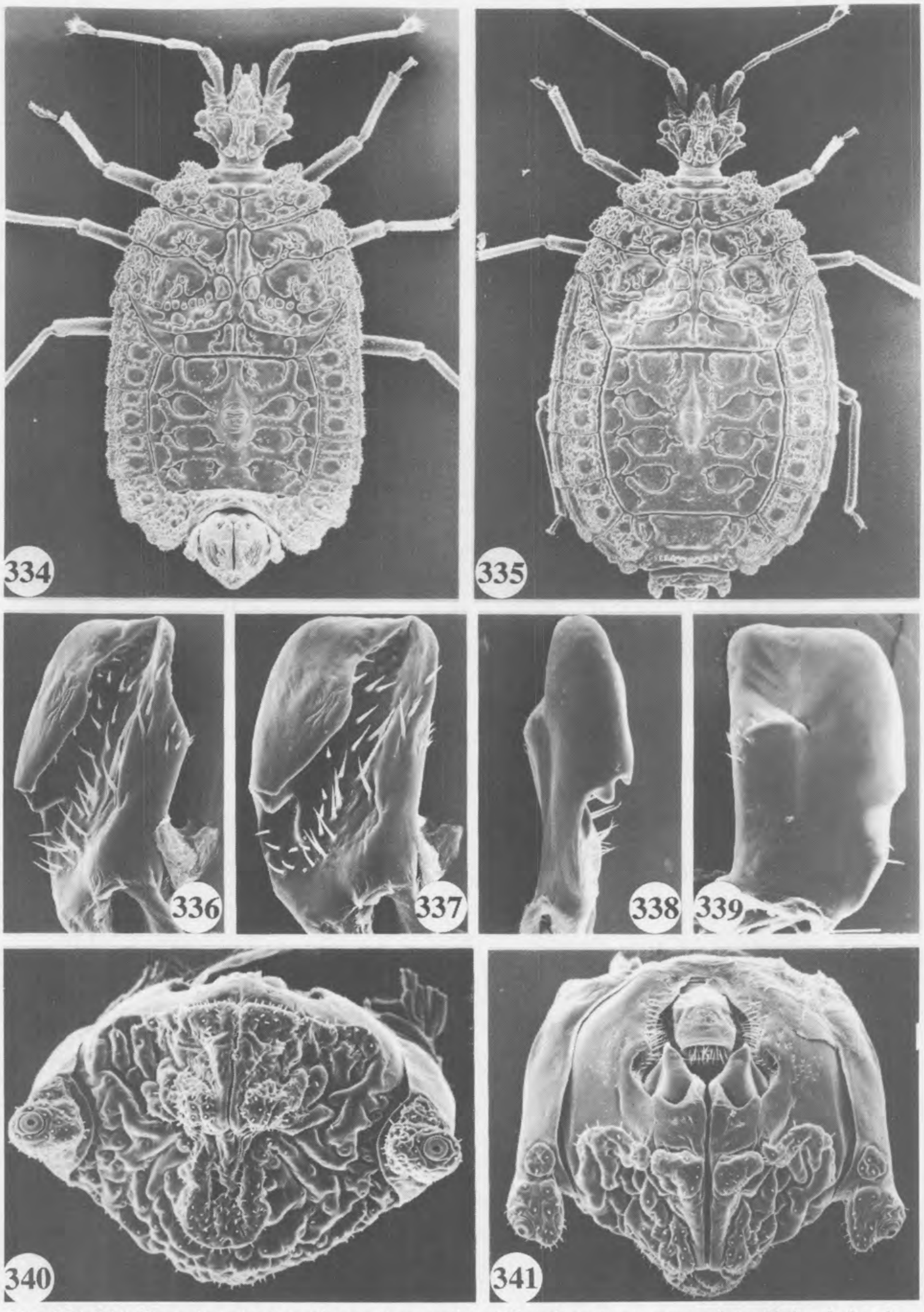
Figs 310-317. Scanning electron photomicrographs of *Dundocoris begemanni* **spec. nov.** 310. Male paratype, dorsal aspect. 311. Female paratype, dorsal aspect. 312-315. Different aspects of the left paramere (scale bar = 50 μm). 316-317. Pygophore. 316. Caudal aspect. 317. Dorsal aspect.



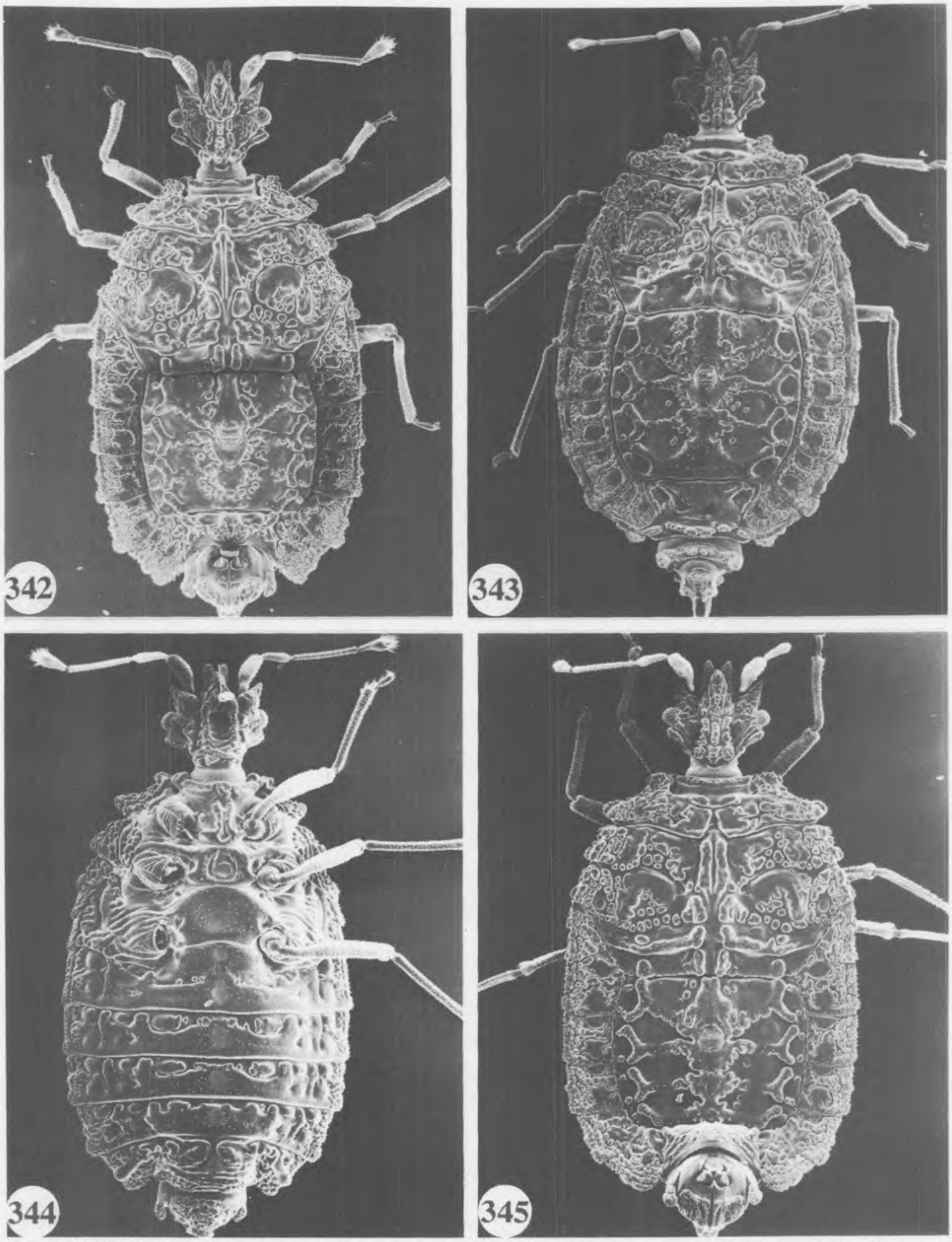
Figs 318-325. Scanning electron photomicrographs of *Dundocoris stuckenbergi stuckenbergi* Heiss & Jacobs. 318-319. Male paratype. 318. Dorsal aspect. 319. Ventral aspect. 320-323. Different aspects of the left paramere (scale bar = 50 μm). 324-325. Pygophore. 324. Caudal aspect. 325. Dorsal aspect.



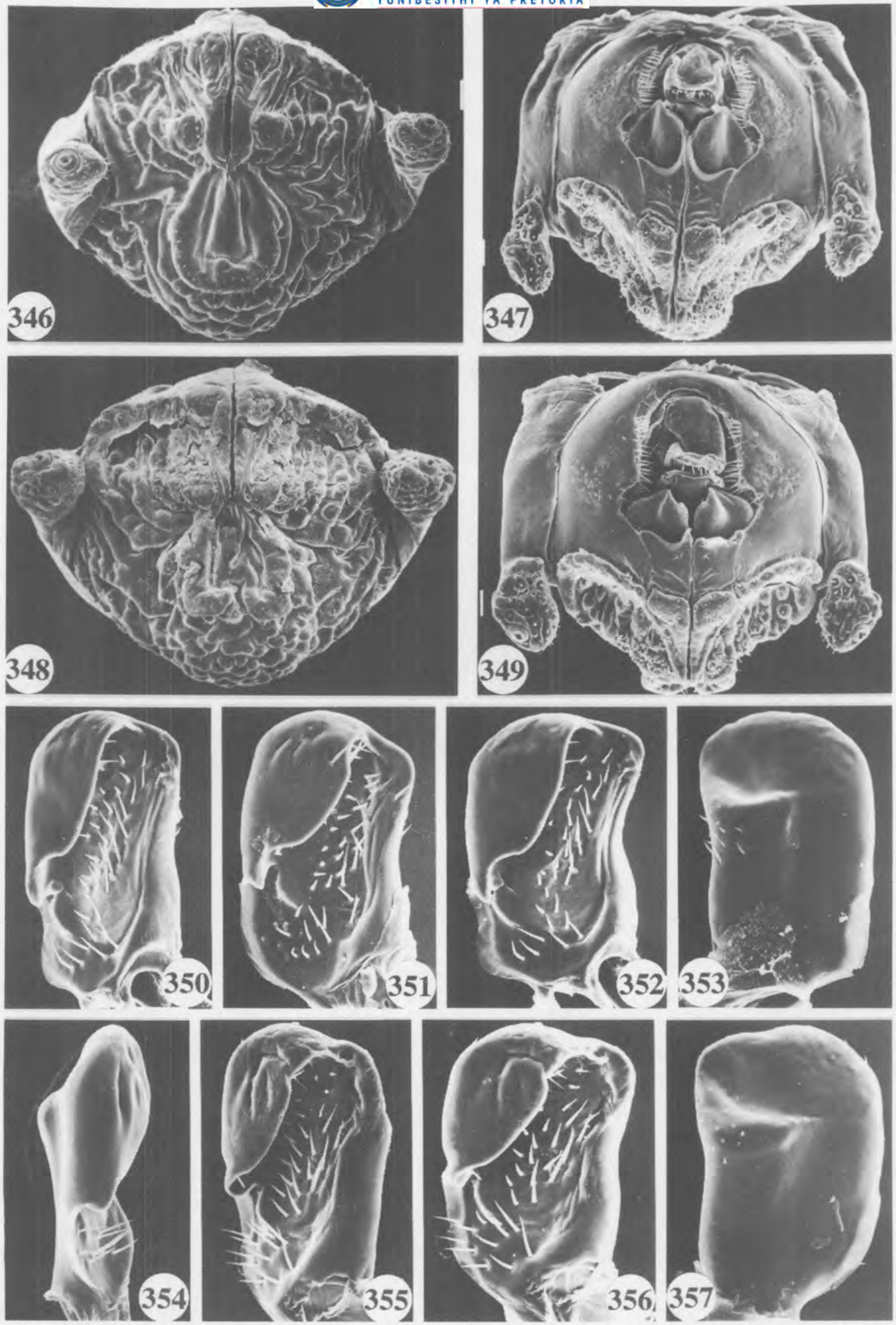
Figs 326-333. Scanning electron photomicrographs of *Dundocoris stuckenbergi ngomensis* **subspec. nov.** 326. Male paratype, dorsal aspect. 327. Female paratype, dorsal aspect. 328-331. Different aspects of the left paramere (scale bar = 50 μm). 332-333. Pygophore. 332. Caudal aspect. 333. Dorsal aspect (scale bar = 50 μm).



Figs 334-341. Scanning electron photomicrographs of *Dundocoris nigromaculatus* Heiss & Jacobs. 334. Male paratype, dorsal aspect. 335. Female paratype, dorsal aspect. 336-339. Different aspects of the left paramere (scale bar = 50 μm). 340-341. Pygophore. 340. Caudal aspect. 341. Dorsal aspect (scale bar = 50 μm).



Figs 342-345. Scanning electron photomicrographs of the subspecies of *Dundocoris flavilineatus* **spec. nov.** 342-344. *D. flavilineatus flavilineatus* **spec. nov.** 342. Dorsal aspect of male paratype. 343. Dorsal aspect of female paratype. 344. Ventral aspect of male paratype. 345. *D. flavilineatus ndabeniensis* **spec. et subspec. nov.**, dorsal aspect of male paratype.



Figs 346-357. Scanning electron photomicrographs of the pygophores and parameres of the subspecies of *Dundocoris flavilineatus* **spec. nov.** 346-349. Pygophores. 346-347. *D. flavilineatus flavilineatus* **spec. nov.** 346. Caudal aspect. 347. Dorsal aspect (scale bar = 50 μm). 348-349. *D. flavilineatus ndabeniensis* **spec. et subspec. nov.** 348. Caudal aspect. 349. Dorsal aspect (scale bar = 50 μm). 350-357. Different aspects of the left paramere. 350-354. *D. flavilineatus flavilineatus* **spec. nov.** 355-357. *D. flavilineatus ndabeniensis* **spec. et subspec. nov.**

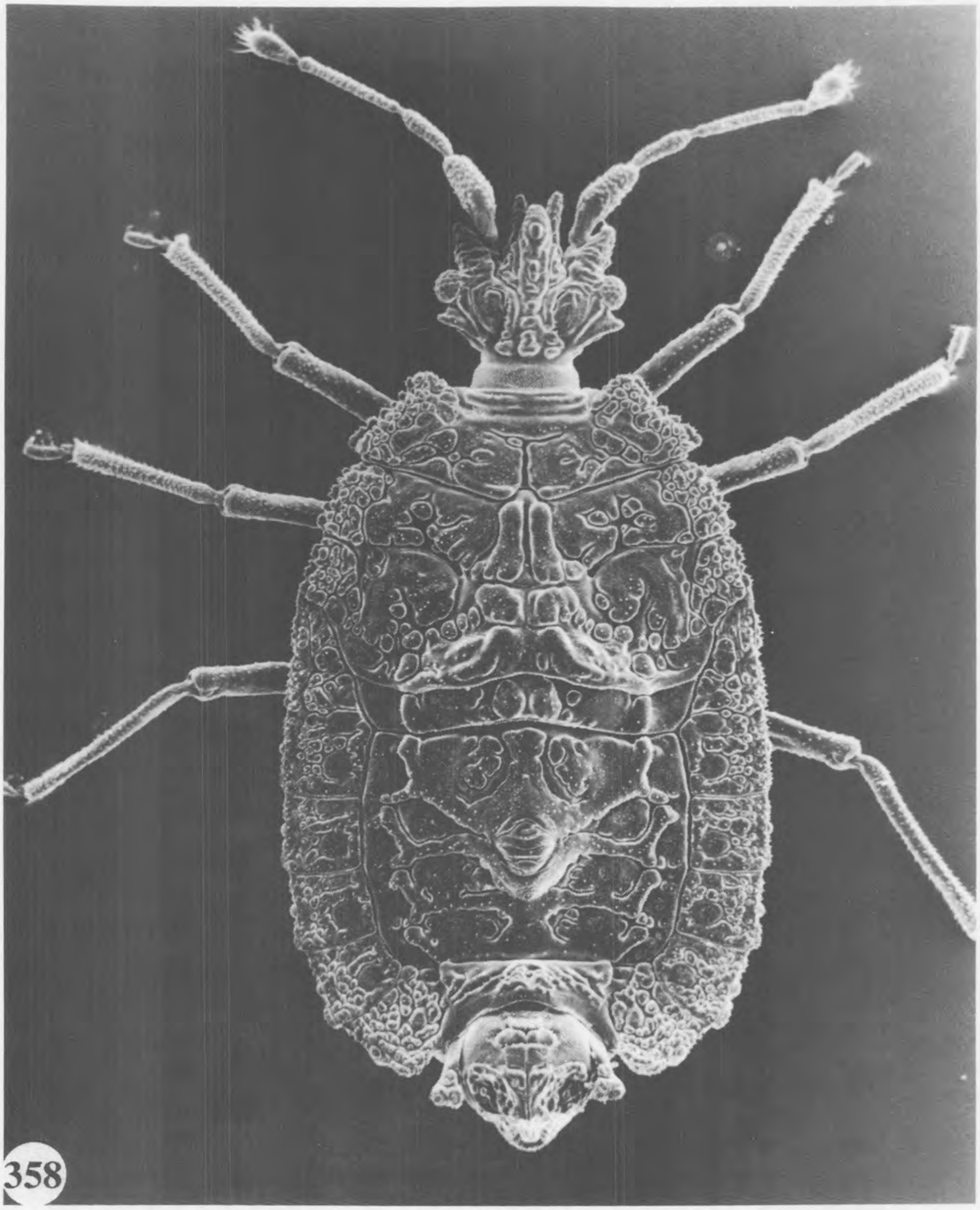


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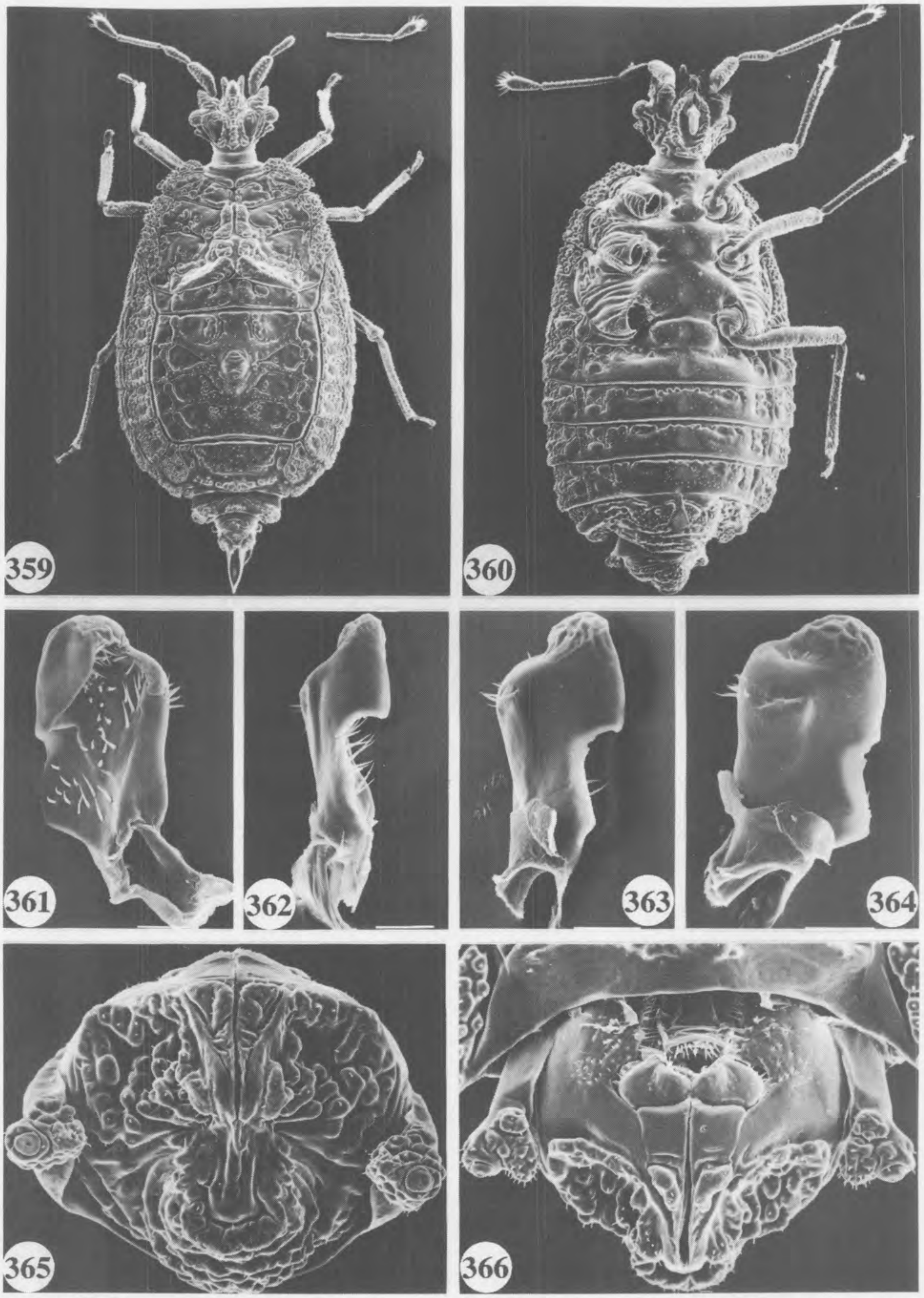
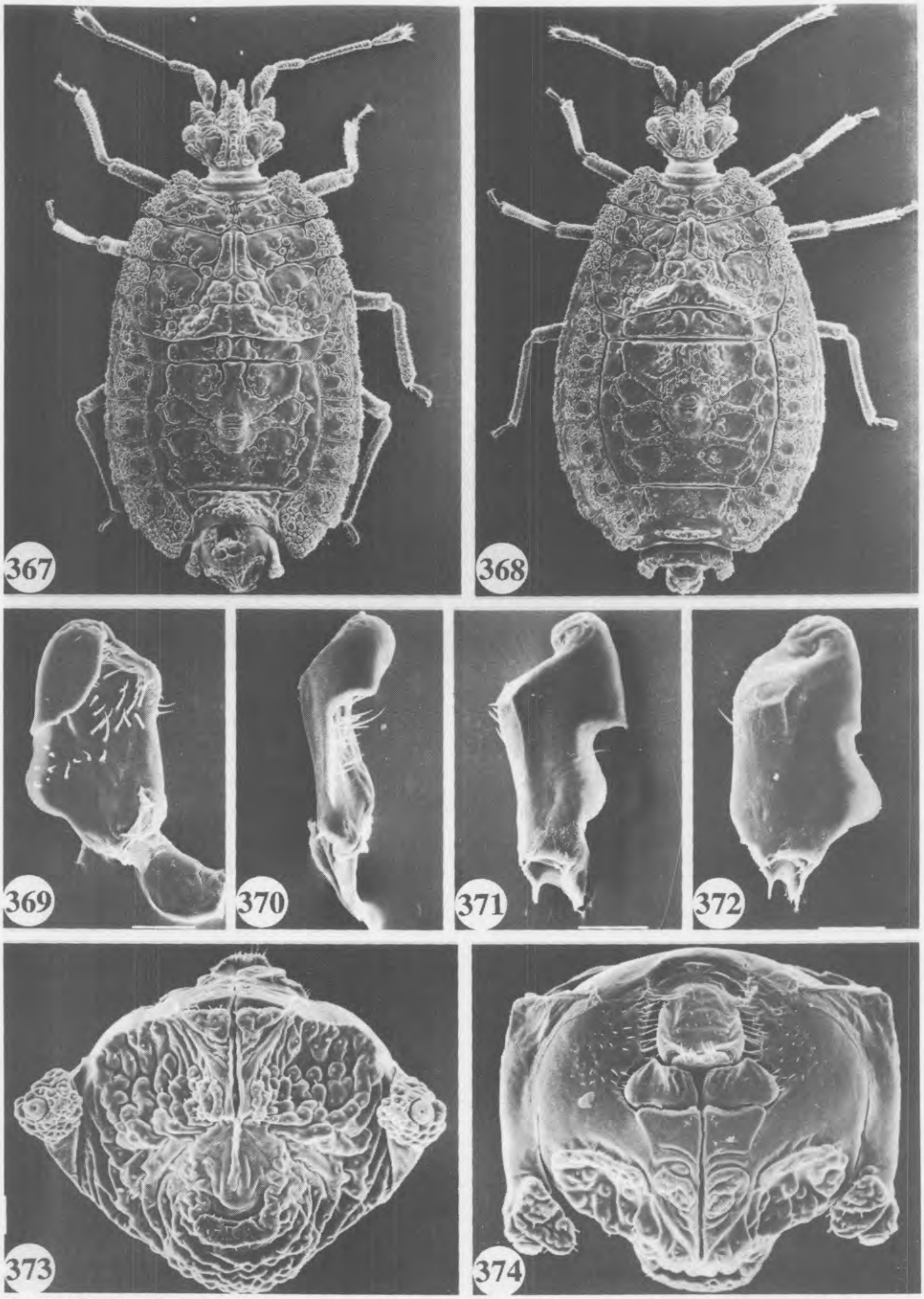
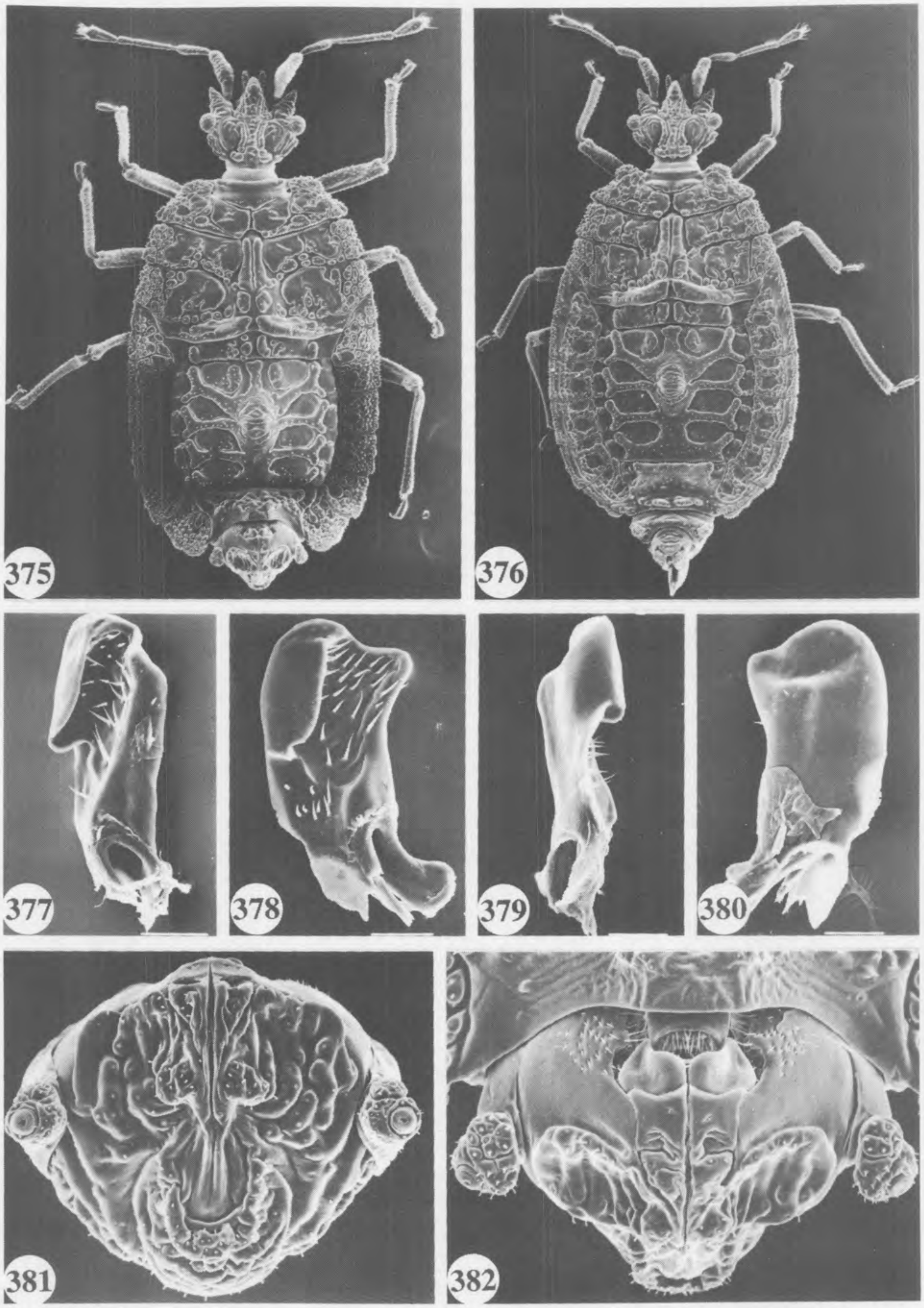
Fig. 358. Scanning electron photomicrograph of *Dundocoris schoemani schoemani* **spec. nov.**, dorsal aspect of male paratype.



Figs 359-366. Scanning electron photomicrographs of *Dundocoris schoemani schoemani* **spec. nov.** 359. Female paratype, dorsal aspect. 360. Male paratype, ventral aspect. 361-364. Different aspects of the left paramere (scale bar = 50 μm). 365-366. Pygophore. 365. Caudal aspect. 366. Dorsal aspect.



Figs 367-374. Scanning electron photomicrographs of *Dundocoris schoemani dwesaensis* **spec. et subspec. nov.** 367. Male paratype, dorsal aspect. 368. Female paratype, dorsal aspect. 369-372. Different aspects of the left paramere (scale bar = 50 μm). 373-374. Pygophore. 373. Caudal aspect (scale bar = 50 μm). 374. Dorsal aspect.



Figs 375-382. Scanning electron photomicrographs of *Dundocoris scholtzi* **spec. nov.** 375. Male paratype, dorsal aspect. 376. Female paratype, dorsal aspect. 377-380. Different aspects of the left paramere (scale bar = 50 μm). 381-382. Pygophore. 381. Caudal aspect. 382. Dorsal aspect.

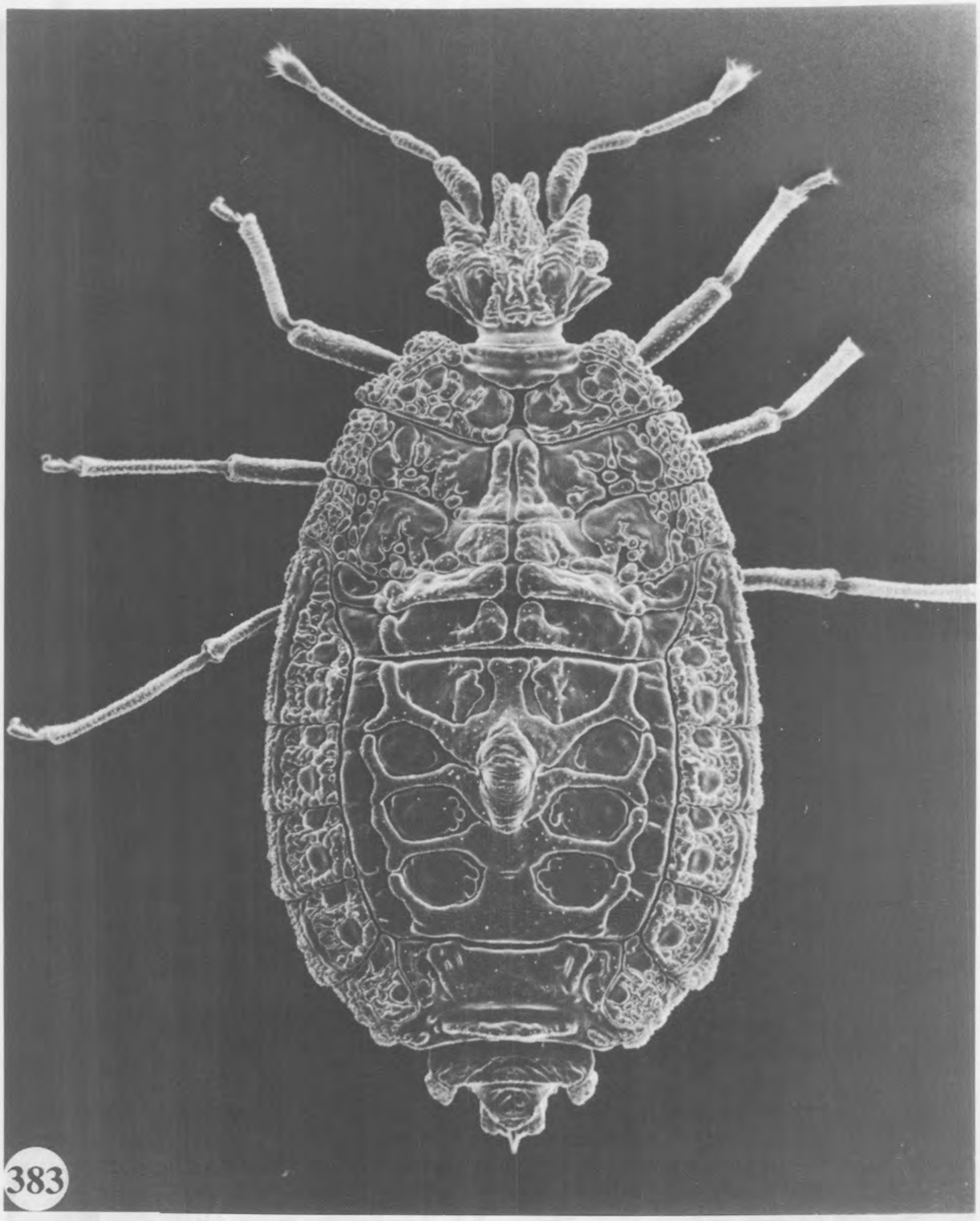
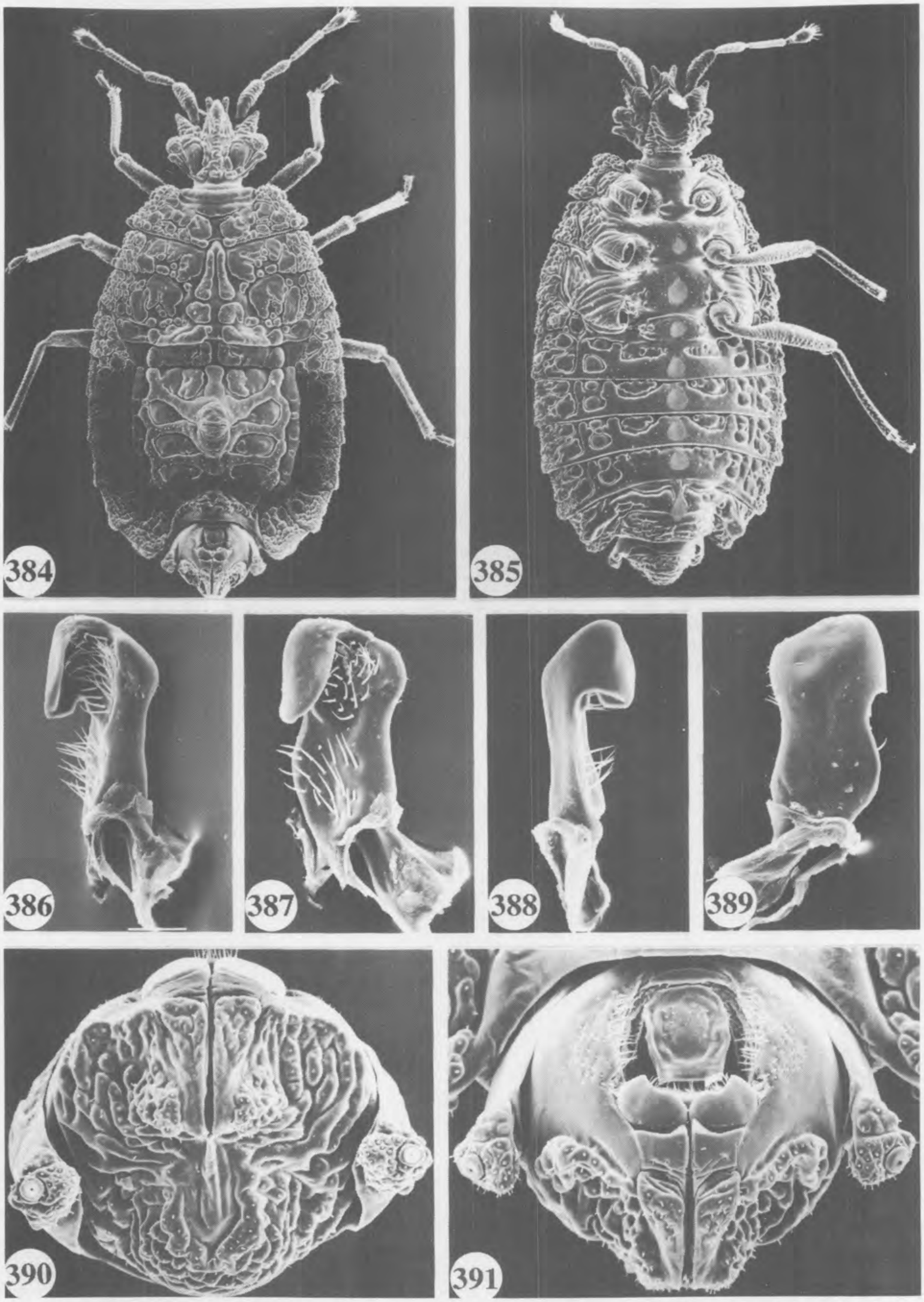
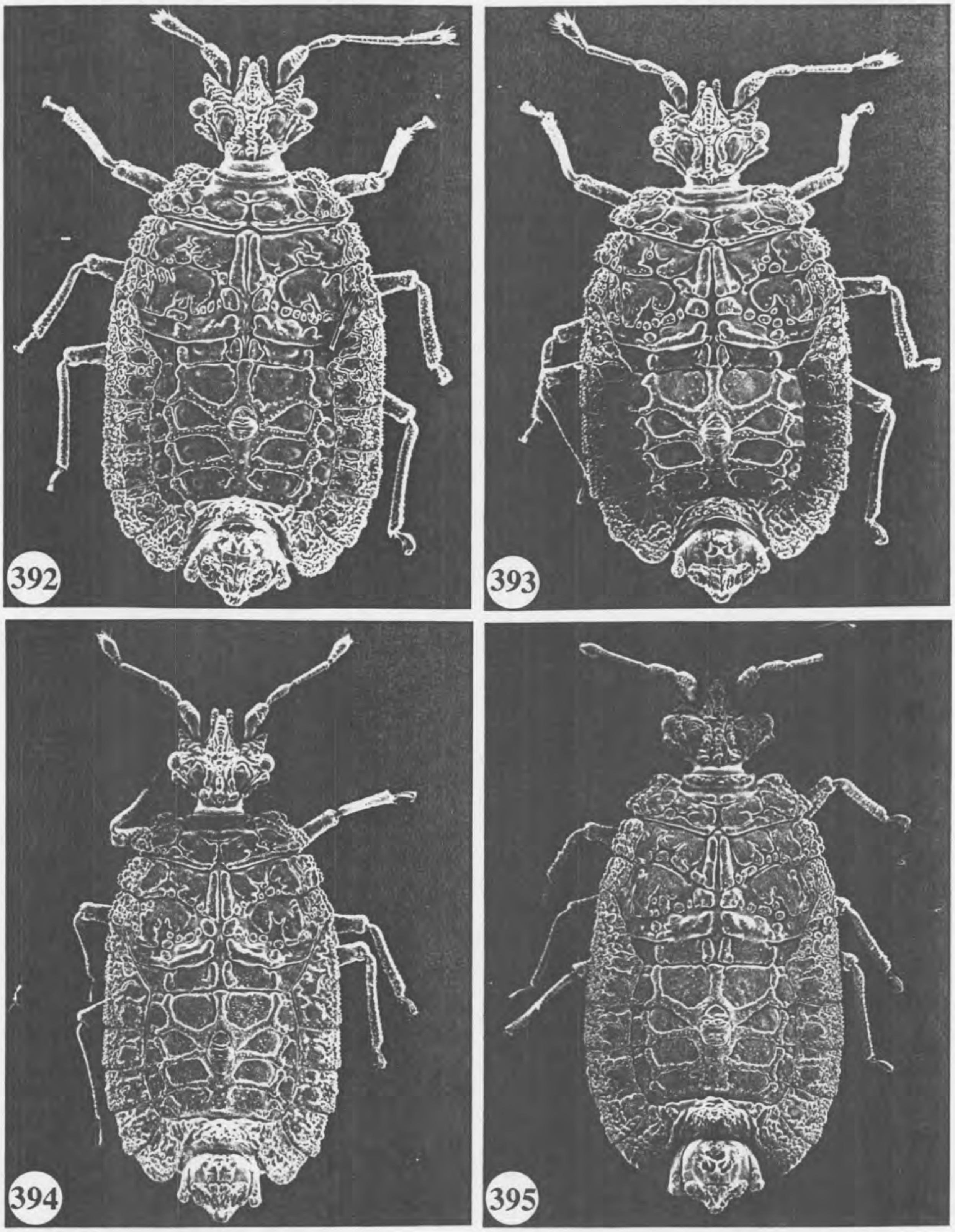


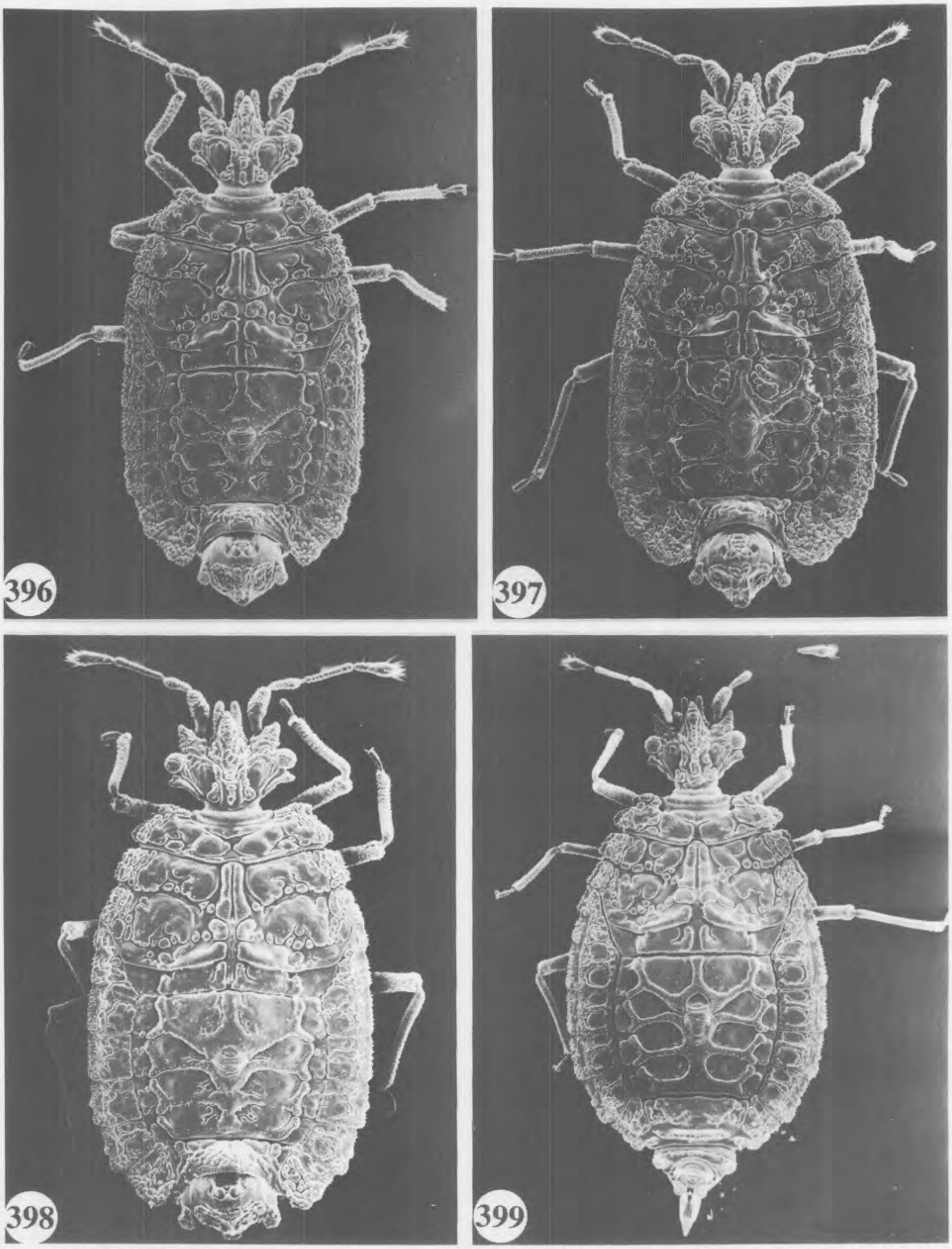
Fig. 383. Scanning electron photomicrograph of *Dundocoris fuscus* **spec. nov.**, dorsal aspect of female paratype.



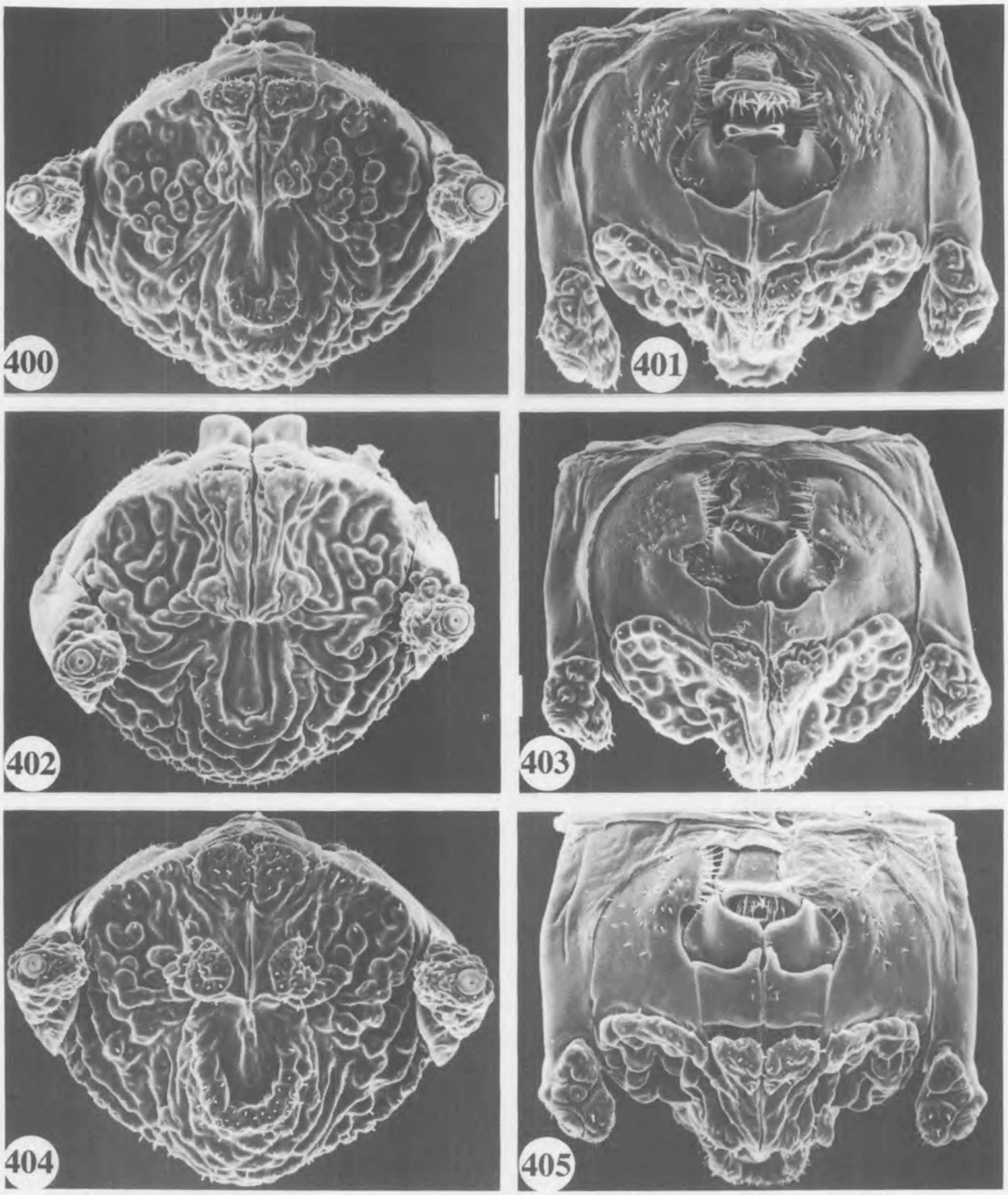
Figs 384-391. Scanning electron photomicrographs of *Dundocoris fuscus* **spec. nov.**. 384-385. Male paratype. 384. Dorsal aspect. 385. Ventral aspect. 386-389. Different aspects of the left paramere (scale bar = 50 μm). 390-391. Pygophore. 390. Caudal aspect. 391. Dorsal aspect.



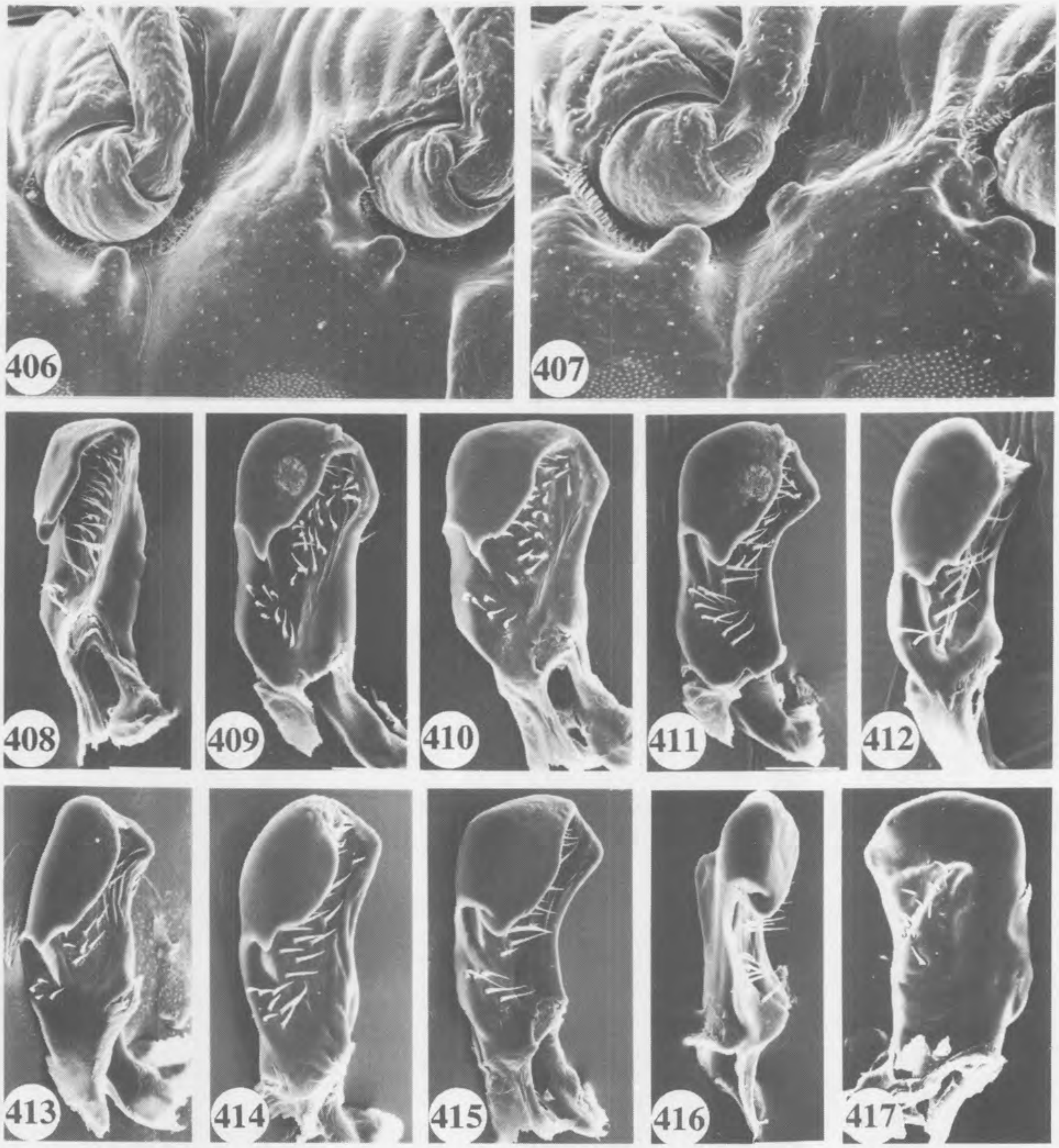
Figs 392-395. Scanning electron photomicrographs of *Dundocoris callani callani Hoberlandt*. 392. Dorsal aspect of male from Scottburgh. 393-394. Dorsal aspects of males from Ngoye Forest. 395. Dorsal aspect of male from Stainbank Nature Reserve.



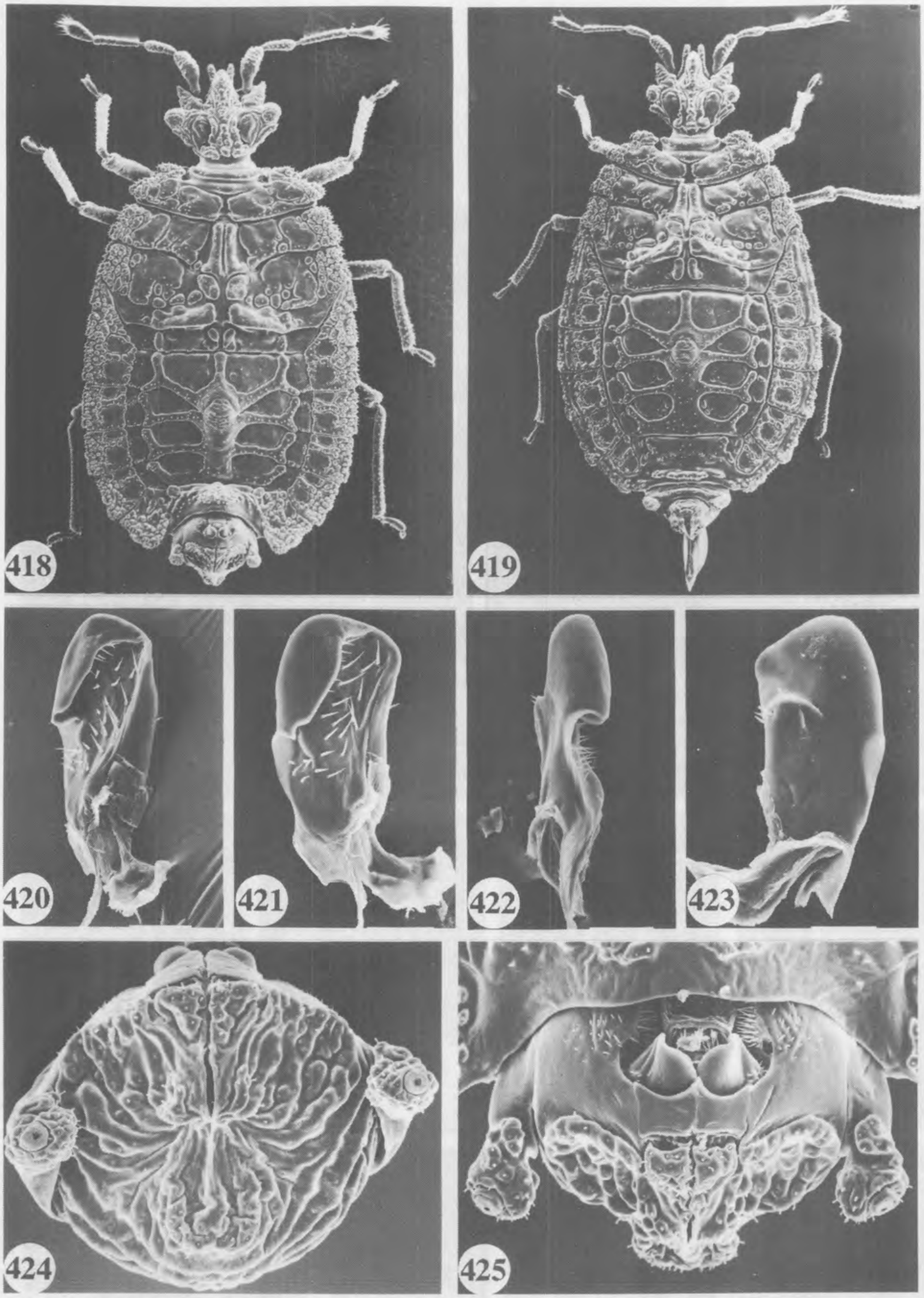
Figs 396-399. Scanning electron photomicrographs of *Dundocoris callani callani* Hoberlandt. 396. Dorsal aspect of male from Port St. Johns. 397. Dorsal aspect of male from Nquaba forest. 398. Dorsal aspect of male from Alexandria forest. 399. Dorsal aspect of female from Ngoye forest.



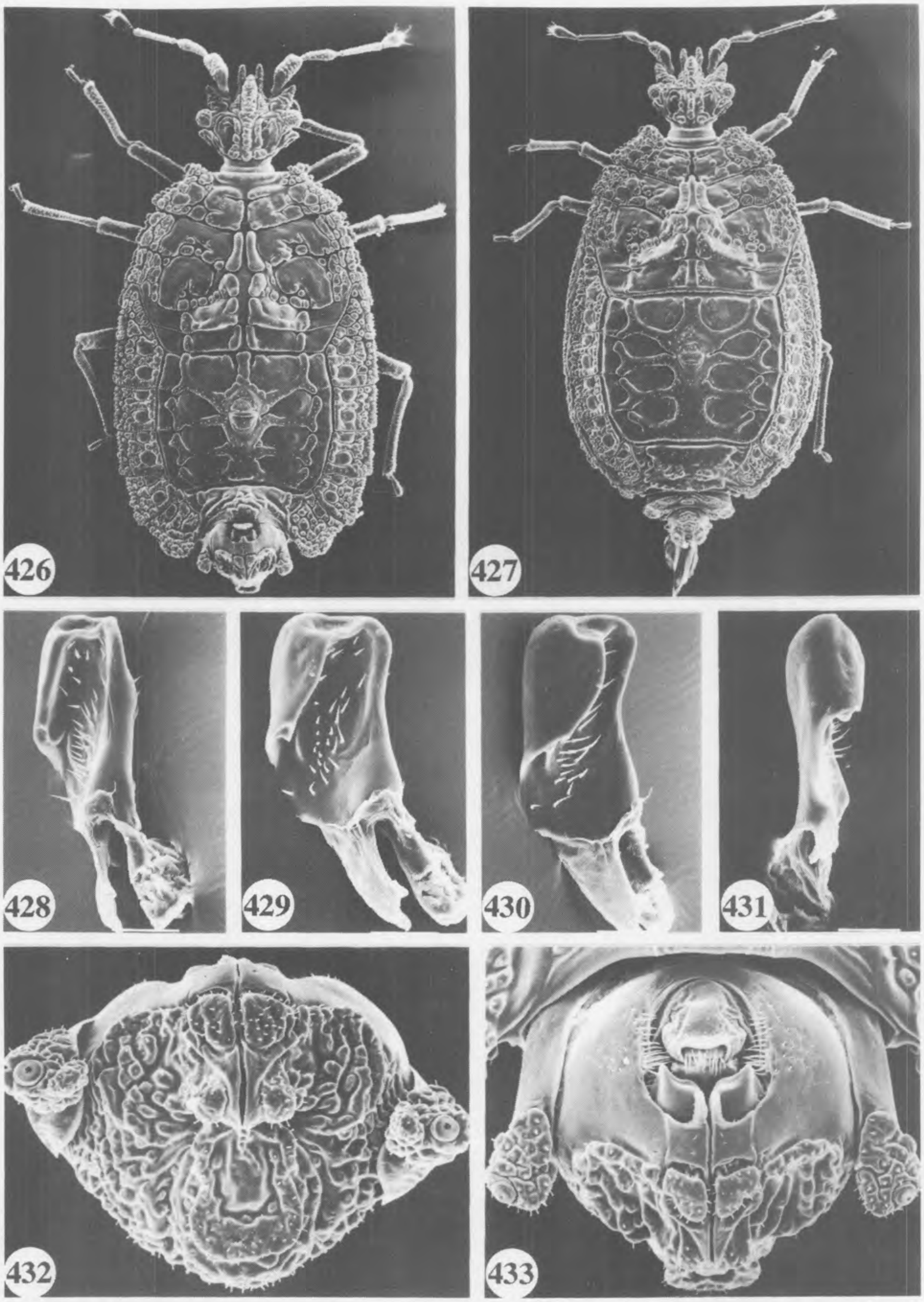
Figs 400-405. Scanning electron photomicrographs of the pygophore of *Dundocoris callani callani* Hoberlandt from different localities. 400-401. From Dwesa forest. 400. Caudal aspect. 401. Dorsal aspect. 402-403. From Scottburgh. 402. Caudal aspect (scale bar = 50 μm). 403. Dorsal aspect (scale bar = 50 μm). 404-405. From Ngoye forest. 404. Caudal aspect. 405. Dorsal aspect.



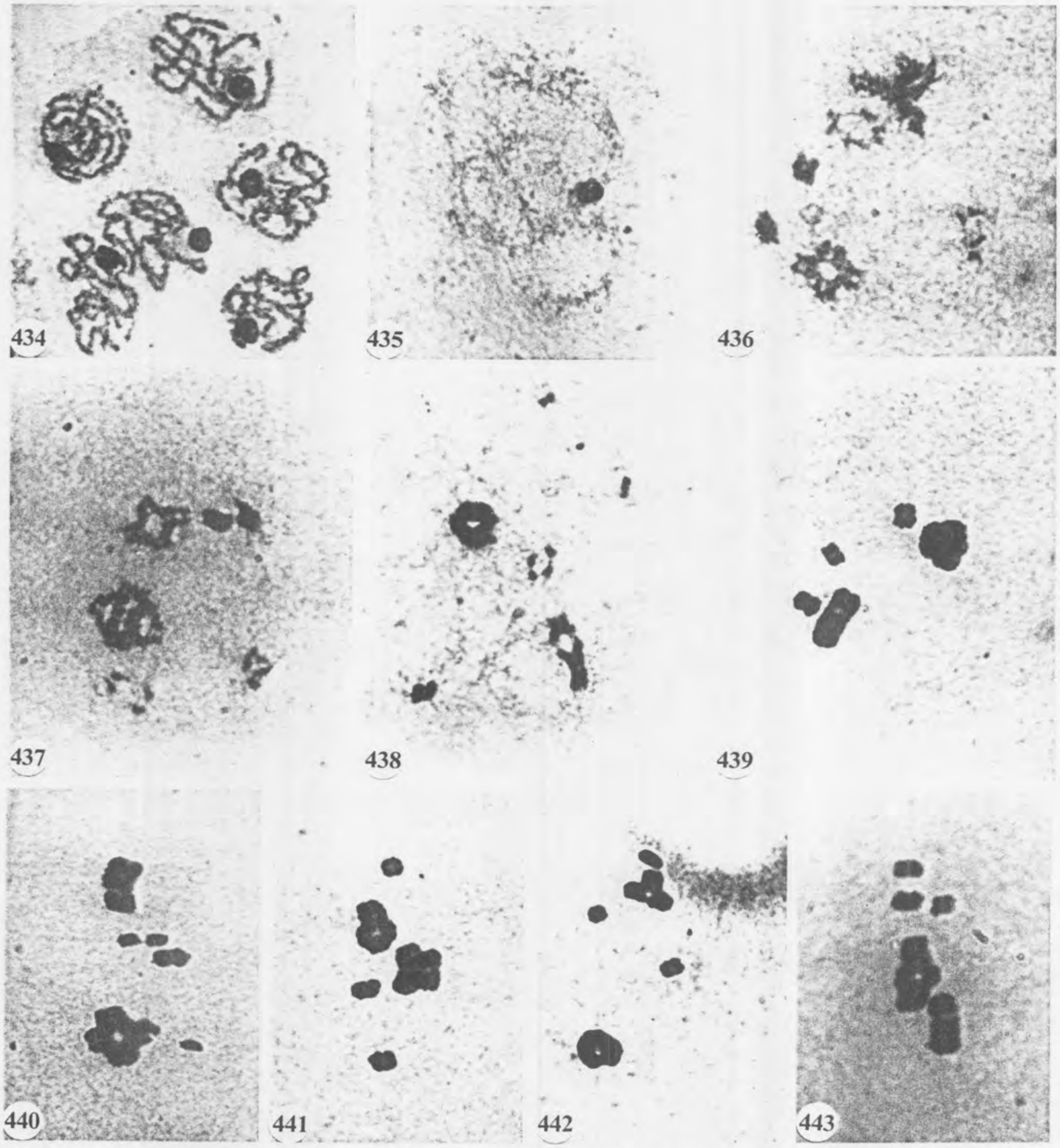
Figs 406-417. Scanning electron photomicrographs of *Dundocoris natalensis* Kormilev and *Dundocoris callani callani* Hoberlandt. 406. Ventral aspect of the metasternum of *D. natalensis* Kormilev showing the absence of the anterolateral tubercle. 407. Same of *D. callani* illustrating the presence of the anterolateral tubercle (arrow). 408-417. Different aspects of the parameres of *Dundocoris callani callani* Hoberlandt from various localities. 408, 410 & 415-417. Scottburgh. 409 & 411. Umdoni Park. 412. Alexandria forest. 413. Ngoye forest. 414. Nquaba forest.



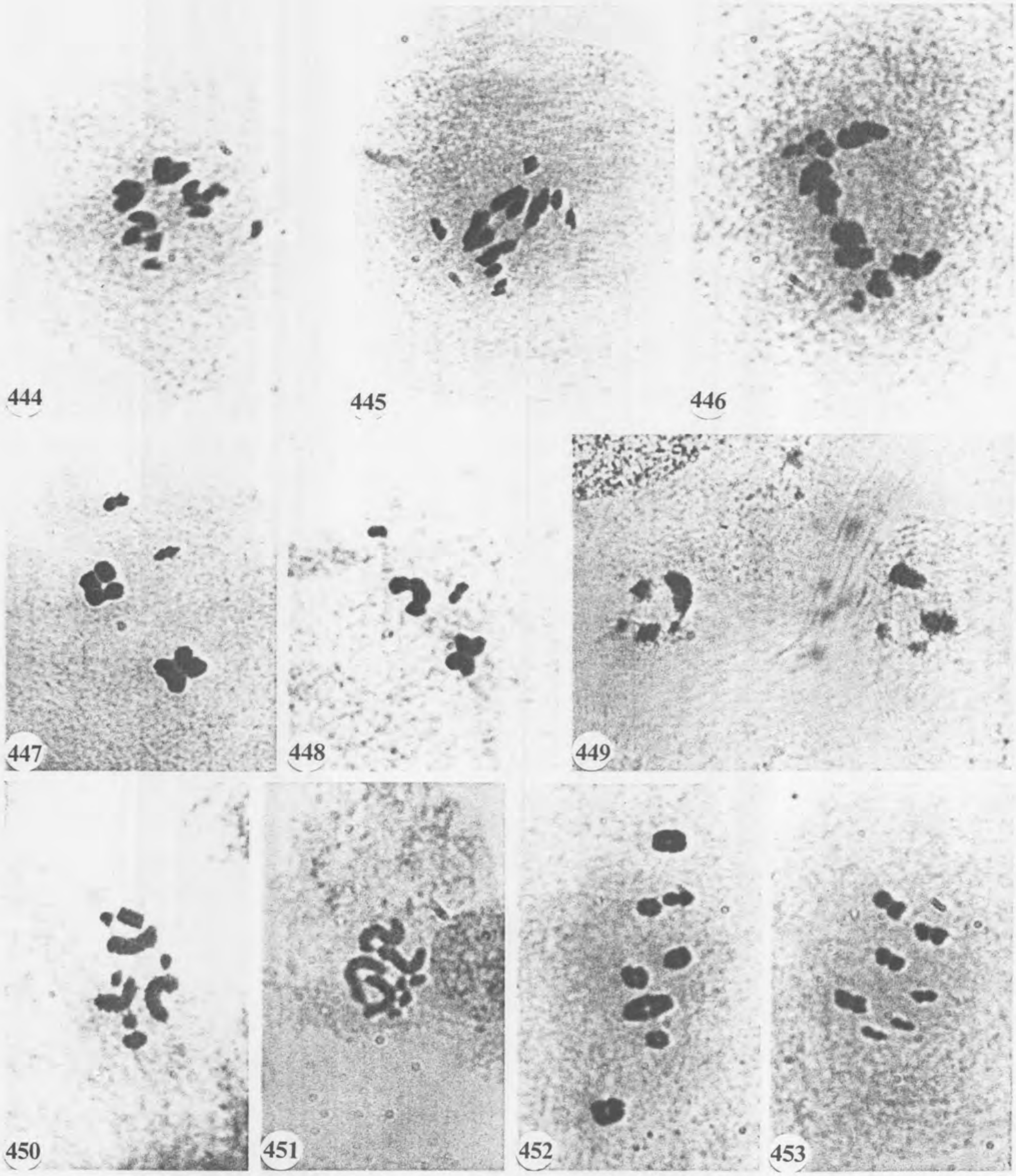
Figs 418-425. Scanning electron photomicrographs of *Dundocoris callani noduliclypeatus* **subspec. nov.** 418. Male paratype, dorsal aspect. 419. Female paratype, dorsal aspect. 420-423. Different aspects of the left paramere (scale bar = 50 μm). 424-425. Pygophore. 424. Caudal aspect. 425. Dorsal aspect.



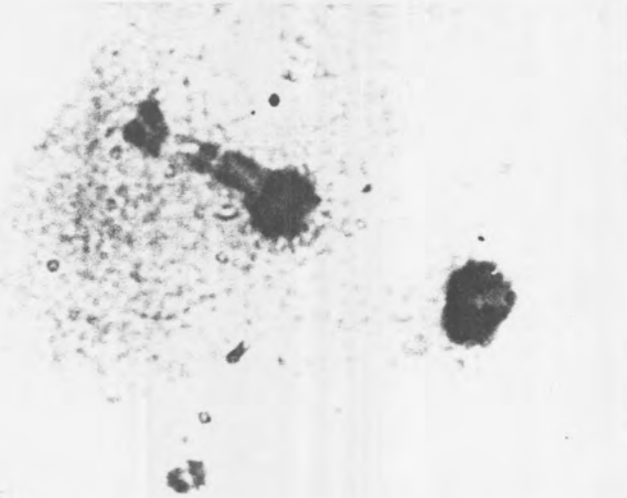
Figs 426-433. Scanning electron photomicrographs of *Dundocoris natalensis* Kormilev. 426. Dorsal aspect of male. 427. Dorsal aspect of female. 428-431. Different aspects of the left paramere (scale bar = 50 μm). 432-433. Pygophore. 432. Caudal aspect. 433. Dorsal aspect.



Figs 434-443. Meiotic stages in *Dundocoris nodulicarinus novenus*. 434. Pachytene. 435. Diffuse stage. 436-437. Diplotene. 438. Diakinesis. 439-443. Metaphase I showing different configurations of the neo-X-Y 'bivalent' and the large autosome.



Figs 444-453. Meiotic stages in *Dundocoris nodulicarinus*. 444-451. *D. nodulicarinus novenus*. 444-446. Anaphase I showing different modes of segregation of the large autosome. 447-448. Metaphase II. 449. Late Anaphase II/Telophase II. 450. Spermatogonial Metaphase. 451. Oogonial Metaphase. 452-453. *D. nodulicarinus nodulicarinus*. 452. Metaphase I. 453. Metaphase II.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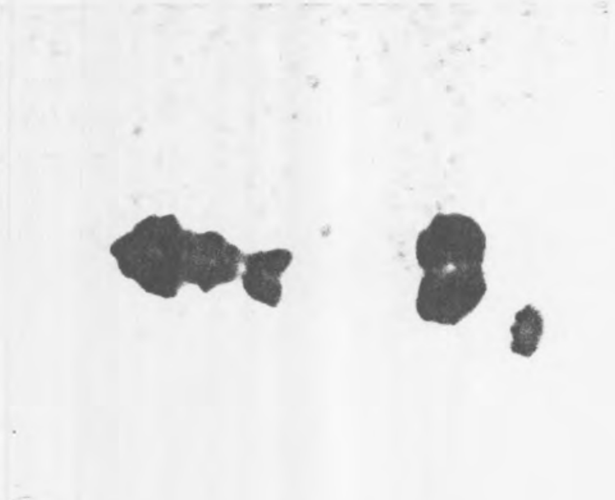
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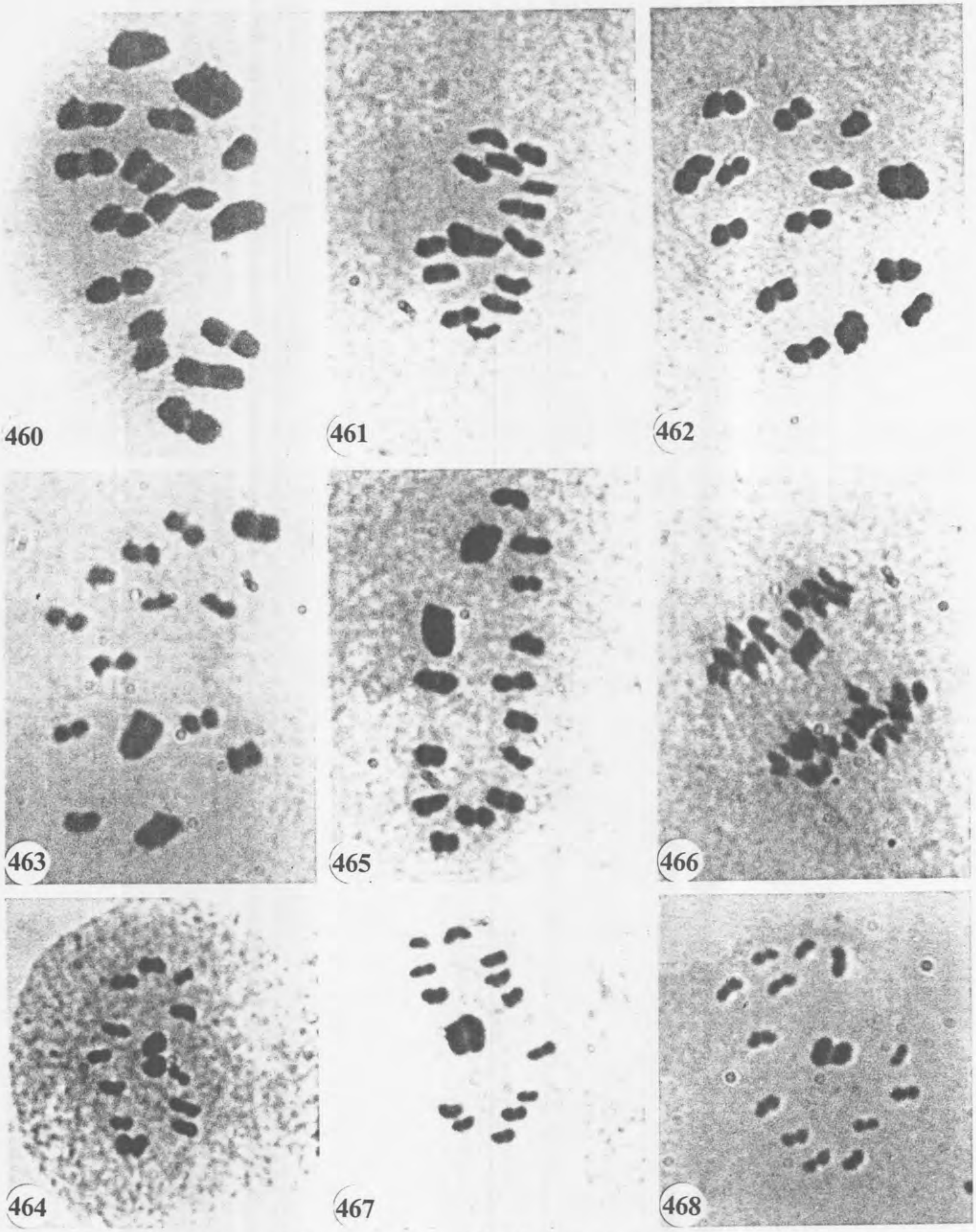
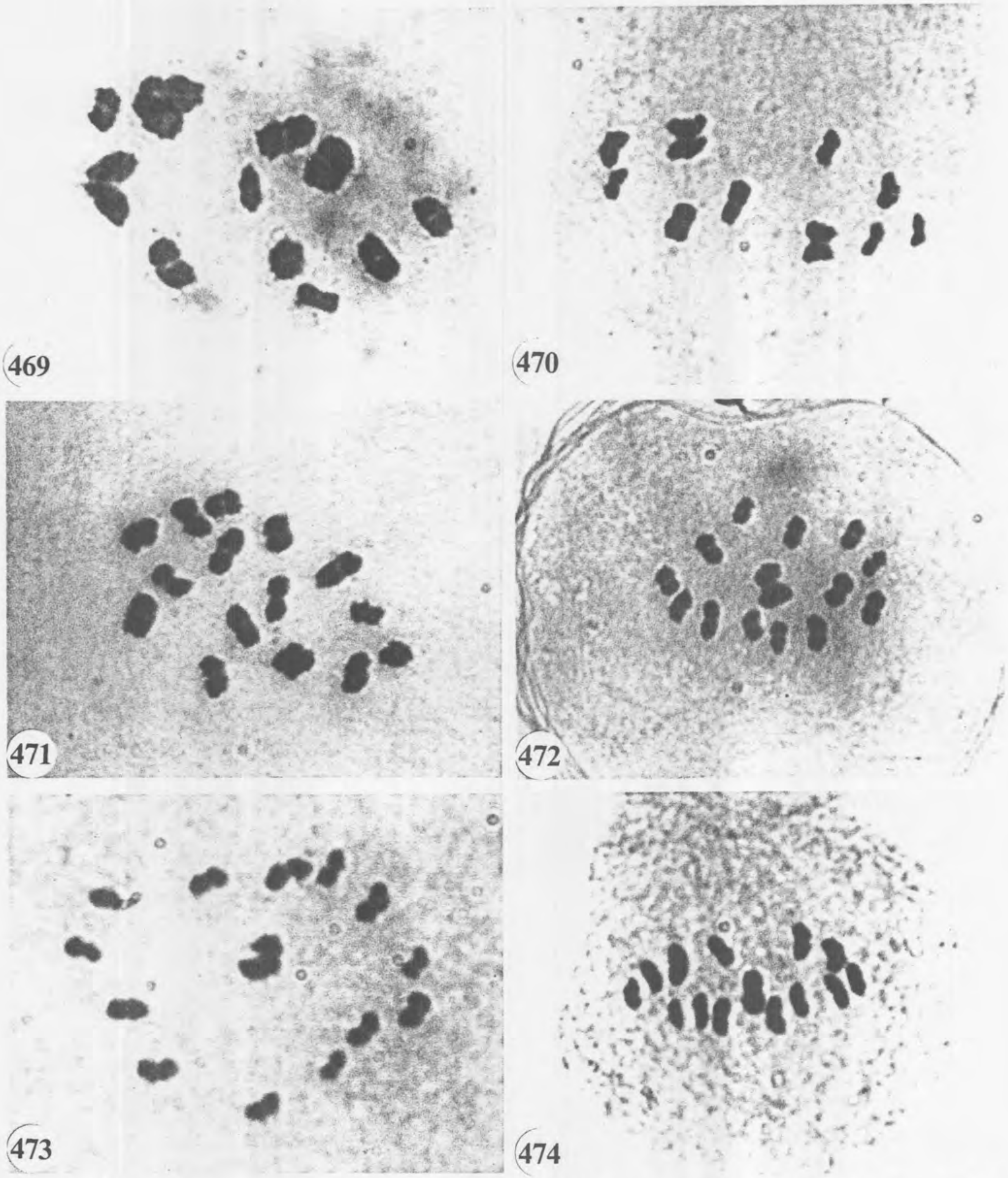
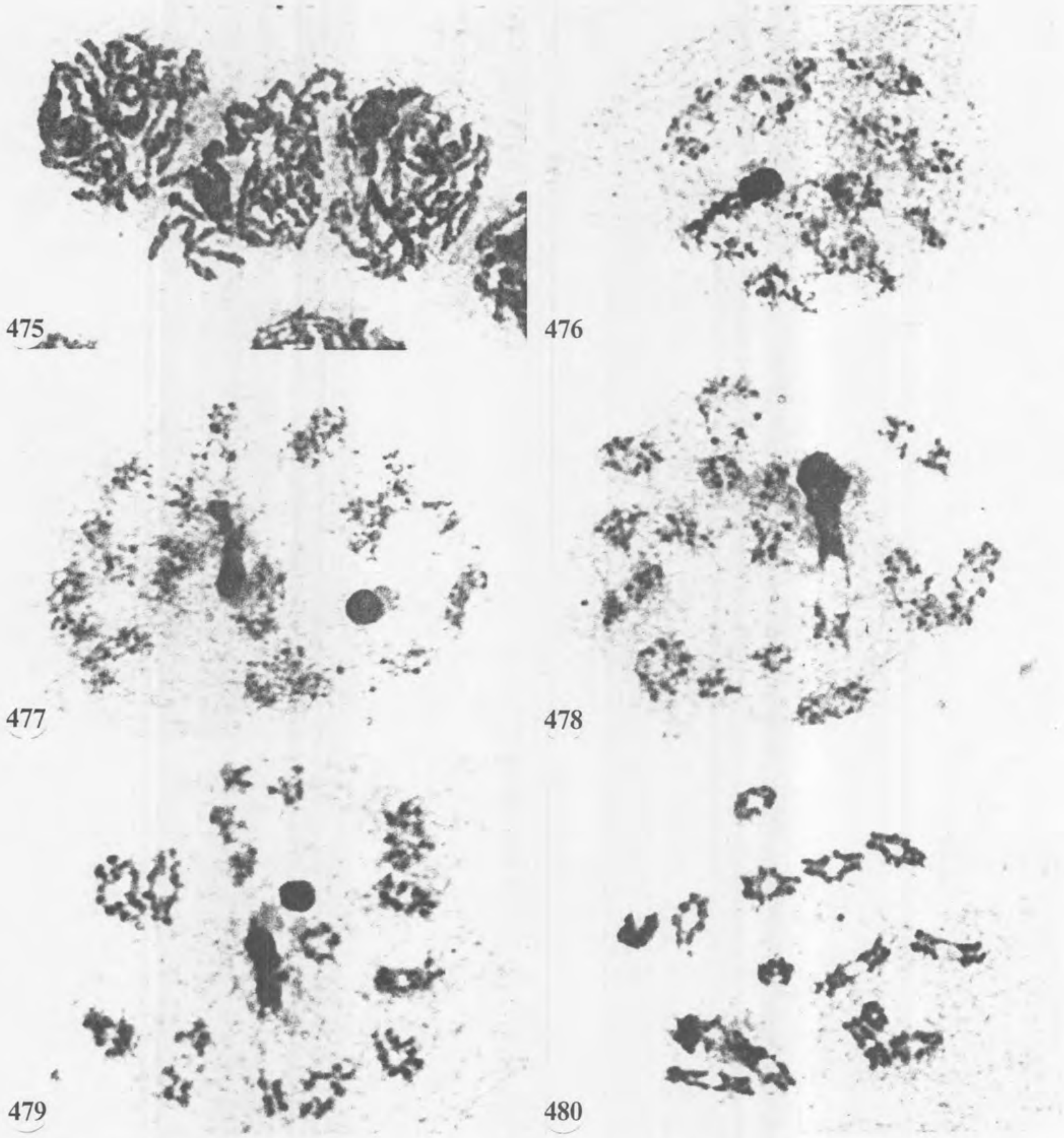
Figs 454-459. Meiotic stages in *Dundocoris nodulicarinus septeni*. 454. Diakinesis showing double crossover in neo-X-Y 'bivalent' and the fusion of the small autosomal pair to the original X- and Y-chromosomes respectively. 455-456. Metaphase I. 457. Metaphase II. 458. Spermatogonial mitosis. 459. Mitosis in female embryo.



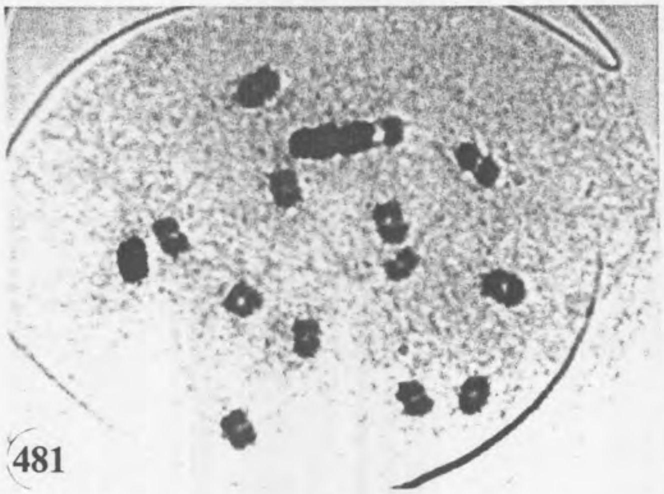
Figs 460-468. Meiotic stages in *Dundocoris* taxa. 460-461. *D. marieps*. 460. Metaphase I. 461. Metaphase II. 462. *D. begemanni*, Metaphase I. 463-464. *D. stuckenbergi stuckenbergi*. 463. Metaphase I. 464. Metaphase II. 465-467. *D. stuckenbergi ngomensis*. 465. Metaphase I. 466. Anaphase I. Note the broadsided movement of the sex chromosomes. 467. Metaphase II. 468. Metaphase II in an undescribed subspecies of *D. stuckenbergi* from Ngoye Forest.



Figs 469-474. Meiotic stages in *Dundocoris* species. 469-470. *D. nigromaculatus*. 469. Metaphase I. 470. Metaphase II. 471-474. *D. flavilineatus flavilineatus*. 471. Metaphase I in a specimen of Ngoye Forest. 472-474. Metaphase II in specimens from different localities. 472. Ngoye Forest. 473. Scottburgh. 474. Mpsheni Forest.



Figs 475-480. Meiotic stages in *Dundocoris flavilineatus ndabeniensis*. 475. Pachytene. 476-478. Diffuse stage. 476. Note the heterochromatic nodulate filametous neo-Y. 477. Note the nucleoli associated with both the original X- and Y-chromosomes. 478. Note the thin filaments connecting the heterochromatic neo-Y and euchromatic neo-X_2. 479-480. Diplotene. 480. Note the autosomal bivalents with interstitial chiasmata.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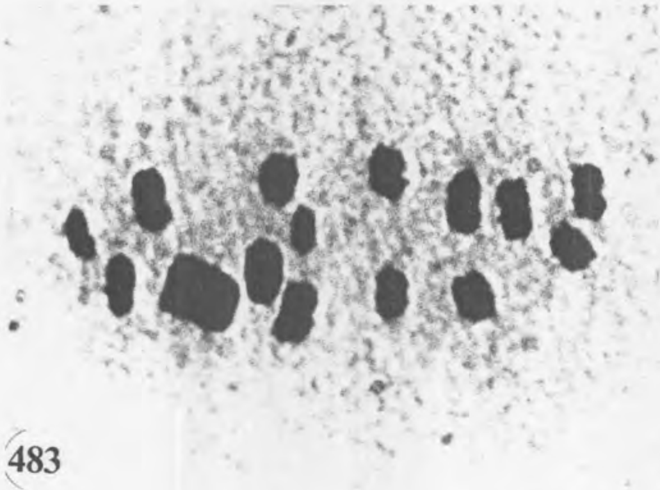
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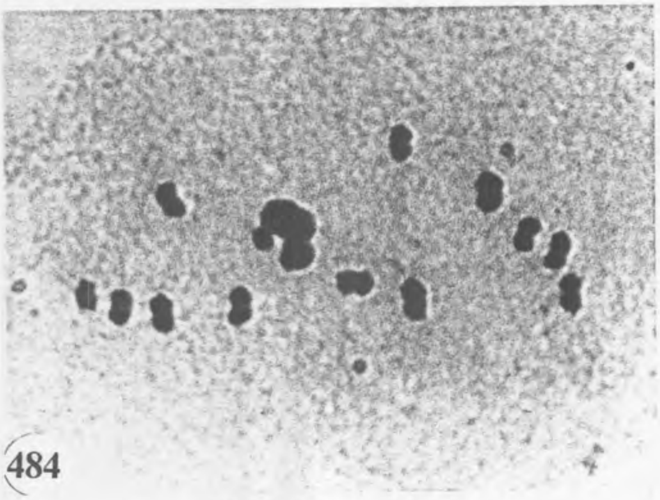
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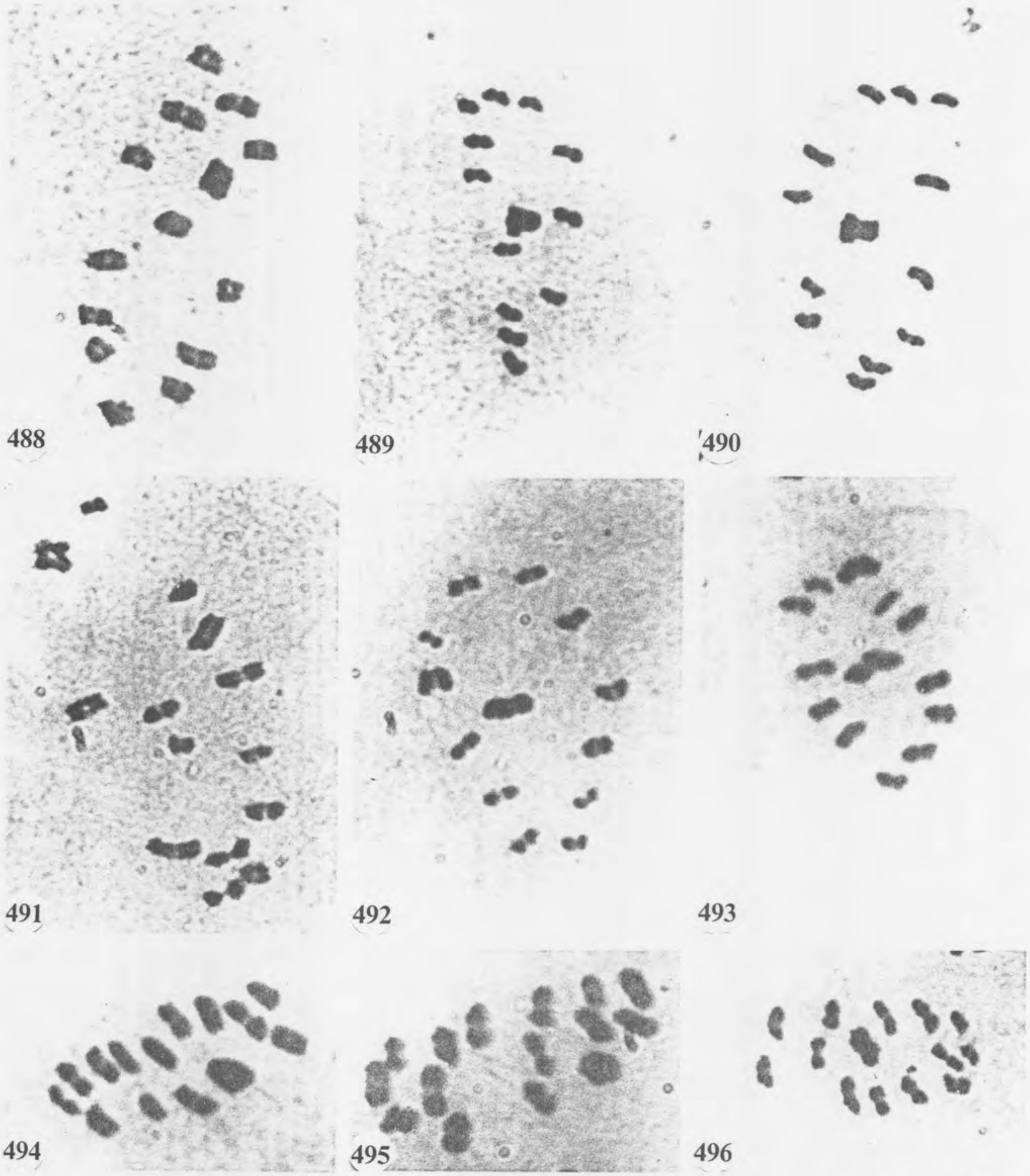
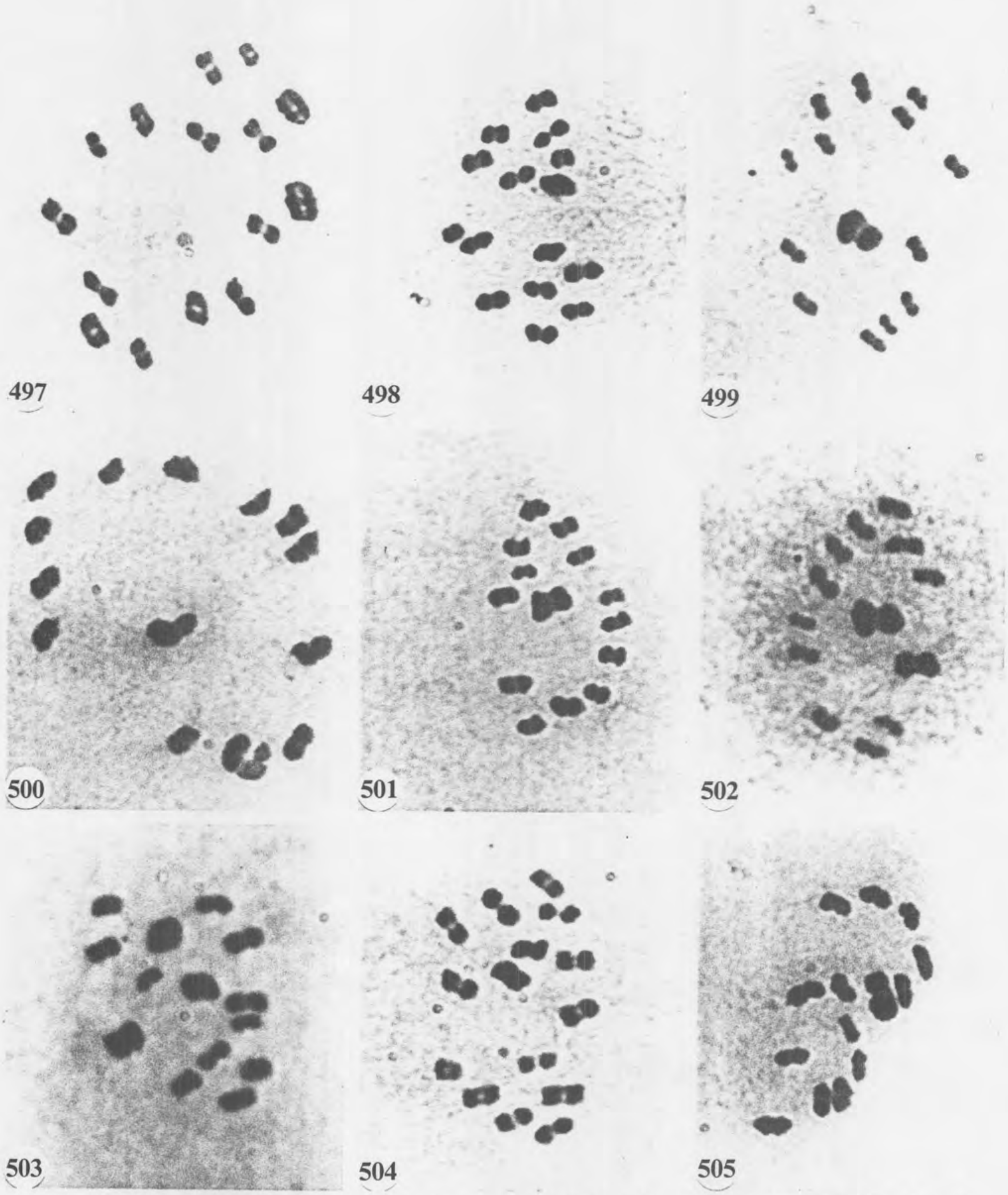
Figs 481-487. Meiotic stages in *Dundocoris flavilineatus ndabeniensis*. 481. Diakinesis. Note the tripartite structure of the neo-Y-X_2 'bivalent'. 482-483. Metaphase I. 482. X_2 attached to neo-Y. 483. X_2 separate from neo-Y. 484. Metaphase II. 485. Tetraploid Metaphase II. 486-487. Spermatogonial mitosis.



Figs 488-496. Meiotic stages in *Dundocoris* taxa. 488-490. *D. schoemani schoemani*. 488. Metaphase I. 489. Metaphase II in a specimen from Baziya Forest. 490. Metaphase II in a specimen from Nquaba Forest. 491-492. *D. schoemani dwesaensis*. 491. Metaphase I. 492. Metaphase II. 493-494. *D. scholtzi*. 493. Metaphase II. 494. Metaphase I. 495-496. *D. fuscus*. 495. Metaphase I. 496. Metaphase II.



Figs 497-505. Meiotic stages in *Dundocoris* taxa. 497-501. *D. callani callani*. 497-498. Metaphase I in specimens from different localities. 497. Ngoye Forest. 498. Scottburgh. 499-501. Metaphase II in specimens from different localities. 499. Ngoye Forest. 500. Nquaba Forest. 501. Scottburgh. 502-503. *D. callani noduliclypeatus*. 502. Metaphase II. 503. Metaphase I. 504-505. *D. natalensis*. 504. Metaphase I. 505. Metaphase II.