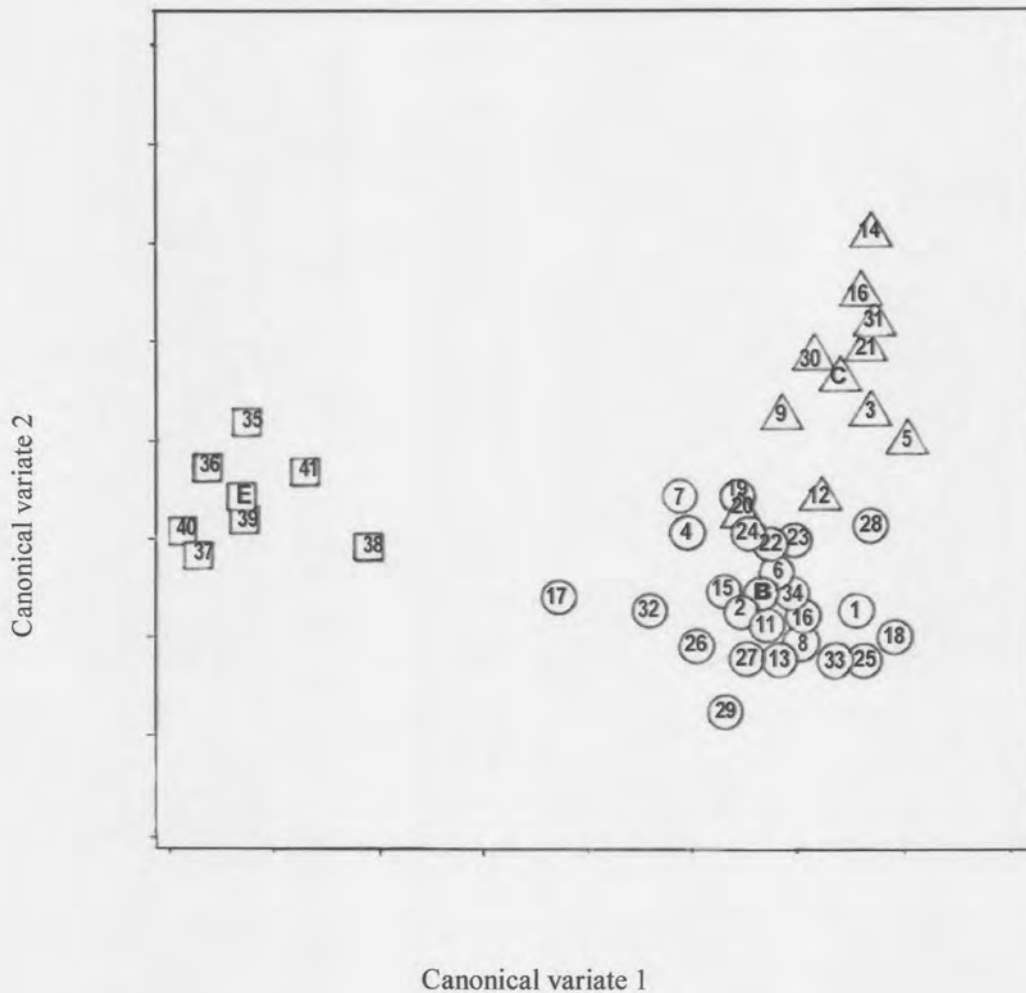


Appendix A: Canonical variate analysis of selected species

Canonical variate analysis (CVA) or (linear) discriminant analysis is used when it is of more interest to show differences between groups than between individuals. The variability in a large number of variates is firstly reduced to a smaller set of variates, which account for most of the variability. The new set of variates, called canonical variates, is linear combinations of the original measurements, and is thus given as vectors of loadings for the original measurements. With this approach a set of directions are obtained in such a way that the ratio of between group variability to within group variability in each direction is maximised. In this study the variates were the taxonomic characteristics, which were measured on each of 41 fungal mitosporic species of the *Bipolaris* complex (Smith 1995).

The data used for the canonical variate analysis were obtained from the descriptions of various *Bipolaris* like fungi in the monograph of Sivanesan (1987). The binary variates (features) used were: stromata, conidiophore surface ornamentation, protuberant hilum, accentuated septa, conidial ornamentation, disproportionated conidial cell, end cells cut off by dark septa and curvature. Discrete variates used were spore shape, spore colour, type of germination, number of septa per conidium, length and width measurements and septum ontogeny.

Figure 2: Differentiation of *Bipolaris*, *Curvularia* and *Exserohilum* using a canonical variate analysis and species as descriptions by Sivanesan (1987).



- (B) - *Bipolaris*; (C) - *Curvularia*; (E) - *Exserohilum*; 1 - *B. australiens*; 2 - *B. bicolor*; 3 - *C. brahyspora*; 4 - *B. brizae*; 5 - *C. clavata*; 6 - *B. coicis*; 7 - *B. crustaceae*; 8 - *B. cynodontis*; 9 - *C. eragrostidis*; 10 - *C. geniculata*; 11 - *B. hawaiiensis*; 12 - *C. intermedia*; 13 - *B. leersiae*; 14 - *C. lunata*; 15 - *B. maydis*; 16 - *B. mediocris*; 17 - *B. micropus*; 18 - *B. miyakei*; 19 - *B. nodulosa*; 20 - *C. oryzae*; 21 - *C. pallescens*; 22 - *B. papendorffii*; 23 - *B. ravenelii*; 24 - *B. sacchari*; 25 - *B. setariae*; 26 - *B. sorghicola*; 27 - *B. sorokiniana*; 28 - *B. spicifera*; 29 - *B. stenospila*; 30 - *C. stapeliae*; 31 - *C. trifolii*; 32 - *B. urochloae*; 33 - *B. victoriae*; 34 - *B. zeicola*; 35 - *E. rostratum*; 36 - *E. holmii*; 37 - *E. longirostratum*; 38 - *E. monoceras*; 39 - *E. pedicellatum*; 40 - *E. prolatum*; 41 - *E. turcicum*.



Appendix B: List of species and strains studied

Table 7: List of strains used in this investigation according to PPRI numbers.

<i>Beauveria bassiana</i>			
6999	Host: Unknown Locality: South Africa Collector: Microbial Solutions Reference: G. Limerick BB	7000	Host: Unknown Locality: South Africa Collector: H. Botha Reference: Gladiator BB
7001	Host: Unknown Locality: South Africa Collector: Dagutat Biolab Reference: Gladiator BB		
<i>Bipolaris cynodontis</i>			
6660	Host: Unknown Locality: Germany Collector: C. Nelson, M 108, 1966 Reference No.: M 120, G. Arnold: (+ strain) Note: This strain did not sporulate.	AUT 6535	Host: <i>Cynodon dactylon</i> Locality: Peregian Beach, Australia Collector: J L Alcorn, 27 August 1978 Reference No.: BRIP 12726 Note: No authenticated cultures could be traced.
6584	Host: <i>Cynodon dactylon</i> Locality: Georgia, United States of America Collector: G.W. Karr & G. Morgen-Jones Reference No.: ATCC 34309	6185	Host: <i>Eragrostis hay</i> Locality: Humansdorp, South Africa. Collector: I.H. Rong, 10 July 1996 Notes: J.L. Alcorn agreed this isolate to be close to <i>B. cynodontis</i> but its conidia is too short.



<i>B. ellisii</i>			
AUT 6537	Host: <i>Dactyloctenium aegyptium</i> Locality: Saibai Island, Australia Collector: J.L. Alcorn, 1 June 1981 Reference No: BRIP 13598 Note: Culture obtained from the author of the species, and from the type locality.	6536	Host: Unknown Locality: Karachi, Pakistan Collector: S.R.H. Rizoi, 1965 Reference No: BRIP 13550
<i>B. indica</i>			
AUT 6567	Host: <i>Brassica nigra</i> Locality: Lucknow, India Collector: J.N. Rai, 1967. Reference No.: IMI 129.790 Note: Listed by Sivanesan as the Ex-type but not in the IMI catalogue.	6541	Host: <i>Amaranthus hybridus</i> Locality: Forest Hill, Australia Collector: P.E. Meyers, 30 March 1973 Reference No.: BRIP 11561
6538	Host: <i>Trianthema portuculastrum</i> Locality: Derby. Australia Collector: R. Shivas, 28 May 1992 Reference No: BRIP 20259		
<i>B. maydis</i>			
AUT 6662	Host: <i>Zea mays</i> Locality: Japan Collector: Y. Nisikado Reference No.: CBS 136.29 Note: The strain is from the author of the name but infertile and grew poorly.	6564	Host: Unknown Locality: Unknown Collector: C. Nelson, 1966 Reference No.: M 122, (+ strain) Be 5, G. Arnold



<p>AUT 6430 and 6667</p>	<p>Host: <i>Zea mays</i> Locality: Unknown Collector: K. Böning Reference No.: CBS 134.39, DSMZ 1149 Note: The same strain was received from two different sources.</p>	<p>6607</p>	<p>Host: <i>Zea mays</i> Locality: Kairi, Australia Collector: W. Pont, 1 May 1973 Reference No.: BRIP 5092 Note: The strain sporulated poorly.</p>
<p>6677</p>	<p>Host: <i>Zea mays</i> Locality: Germany Collector: Haltmann Reference No.: DSMZ 62623, IMI 11635</p>		
<i>B. papendorfii</i>			
<p>AUT 6568</p>	<p>Host: Leaf litter under <i>Acacia karroo</i> Locality: Potchefstroom, South Africa Collector: M.C. Papendorf, 1968 Reference No.: IMI 136.484 Ex-type</p>	<p>6709</p>	<p>Host: <i>Dacanthium annulatum</i> Locality: Unknown Collector: B.L. Jain Reference No.: DSMZ 62593, IMI 121.159</p>
<p>6539</p>	<p>Host: <i>Triticum aestivum</i> Locality: Australia Collector: A.L. Alcorn, 15 October 1984 Reference No.: BRIP 14503</p>	<p>6314</p>	<p>Host: Turf grass Locality: Pretoria, South Africa Collector: I.H. Rong, 20 October 1996.</p>
<p>5855</p>	<p>Host: Unidentified grass Locality: Onderstepoort, South Africa Collector: I.H. Rong, 13 March 1996.</p>	<p>6124</p>	<p>Host: <i>Vigna uniuiculata</i> Locality: Roodeplaat, South Africa Collector: I.H. Rong, 28 May 1996</p>



<i>B. setariae</i>			
AUT 6665	Host: Unknown Locality: Unknown Collector: S. Ito Reference No.: CBS 141.31 Note: The strain is from the author of the teleomorph <i>Cochliobolus setariae</i> but is infertile and grew poorly.	6572	Host: <i>Setaria italica</i> seeds Locality: Unknown Collector: Schramm Reference No.: DSMZ 62599 Note: The strain sporulated poorly.
6663	Host: <i>Pennisetum typhoides</i> Locality: Hawkinsville, Georgia, USA Collector: E.S. Luttrell, 3 September 1970 Reference No.: BRIP 6514 Note: The strain sporulated poorly.		
<i>C. affinis</i>			
AUT 6428	Host: <i>Musa sapientum</i> Locality: Gabon Collector: J. Nicot Reference No.: CBS 492.70.	6652	Host: <i>Manihot utilissima</i> Locality: Indonesia Collector: K.B. Boedijn & J. R. Reitsma Reference No.: CBS 185.49, IMI 038975, QM 8064, BR 6/48 Note: The strain is from the author of the name.
6676	Host: <i>Musa sapientum</i> Locality: Columbia Collector: H. Nirenberg Reference No.: DSMZ 63274	6545	Host: Unknown Locality: Congo Collector: J. Meyer Reference No.: BRIP 8521



C. cymbopogonis

AUT 6675	Host: <i>Sorghum</i> sp Locality: Sudan Collector: Fraser-Ass., East Craigs UK, 1967 Reference No.: IMI 130.402 Ex-type Note: The strain forms immature ascomata.	6661	Host: <i>Citronella</i> sp. Locality: Guatemala Collector: J.W. Groves Reference No.: CBS 185.48, ATCC 38580
6532	Host: <i>Sorghum plumosum</i> Locality: Rifle Ck, Australia Collector: J.L. Alcorn, 28 October 1988 Reference No.: BRIP 16516	6592	Host: <i>Rottboellia exaltata</i> Locality: Louisiana Collector: H.C. Walker Reference No. ATCC 42014 Note: see Walker & White (1979)
6297	Host: <i>Hyperthelia dissoluta</i> Locality: Rusape, Zimbabwe Collector: I.H. Rong, 5 September 1996		

C. fallax

AUT 6445	Host: Air Locality: Indonesia Collector: K.B. Boedijn Reference No.: CBS 155.34 Ex-syn- type culture	6574	Host: <i>Oryza sativa</i> Locality: Nigeria Collector: H. Nirenburg Reference No.: DSMZ 631.69
6534	Host: <i>Ectrosia agrostoides</i> Locality: Horn Island, Australia Collector: J.L. Alcorn, 3 June 1981 Reference No.: BRIP 13602	6533	Host: <i>Spinifex longifolius</i> Locality: Yorke Island, Australia Collector: J.L. Alcorn, 2 June 1981 Reference No.: BRIP 13600



<i>C. lunata</i> No ex type cultures available, reference culture supplied by J.L. Alcorn			
6565	Host: <i>Crotalaria juncia</i> seed Locality: Thailand Collector: Unknown Reference No.: I 3907, DSM 63137	AUT 6540	Host: <i>Sorghum plumosum</i> Locality: Cape York Peninsula, Australia Collector: J.L. Alcorn, 31 May 1981 Reference No.: BRIP 13582, IMI 266331
6659	Host: Unknown Locality: Unknown Collector: Unknown, 1983 Reference No.: ATCC 13633, NRRL 2343, CBS 207.59; GLAXO C2100 Note: This strain is used for Preceptrol® but is infertile and growth very poorly.	6699	Host: <i>Zea mays</i> Locality: North Carolina, USA Collector: Unknown Reference No.: NRRL 6409
6700	Host: Ex-Japanese socks Locality: New Guinea Collector: Unknown Reference No.: QM 2105, NRRL 2178	3360	Host: <i>Tribulus terrestris</i> Locality: Oudtshoorn, South Africa Collector: W.F.O.M. Marasas, 6 July 1988
5606	Host: <i>Persea americana</i> flower buds Locality: Nelspruit, South Africa Collector: I.H. Rong, 1 November 1994		



E. inaequale

AUT 6666 and 6527	Host: Plant material Locality: Nigeria Collector: D.B. Olufolagi, 31 August 1983 Reference No.: CBS 503.90, VTT D-79116, ATCC 60765 Ex-type Note: Collection data used is from Sivanesan (1987); The same culture was received from different sources.	6573	Host: <i>Phleum pratense</i> Locality: Iceland Collector: Shramm Reference No.: DSMZ 62462, IMI 12469
6570	Host: Unknown Locality: Angers, France Collector: C.H.R.U, Medical Centre Reference No.: CNCM 2027.92	6668	Host: <i>Triticum aestivum</i> Locality: Australia Collector: M. Meblads, July 1984. Reference No.: BRIP 14448
5940	Host: grass Locality: Rusape, Zimbabwe Collector: I.H. Rong, 27 May 1995	.	
<i>E. longirostratum</i>			
AUT 6612	Host: <i>Mentha arvensis</i> Locality: India Collector: K.K. Janardhanan Reference No.: ATCC 60764, IMI 279094	5133	Host: <i>Musa</i> sp Locality: Nelspruit, South Africa Collector: I.H. Rong, June 1993 Note: Pairings of this strain is fertile with 10 Australian isolates of the same species.



<i>E. longirostratum</i> (continue)			
6528	Host: <i>Cymbopogon citratus</i> Locality: Pullenvale, Australia Collector: J.L. Alcorn, 22 February 1988 Reference No.: BRIP 16114	<u>6529</u>	Host: <i>Zea mays</i> Locality: Atherton Tableland, Australia Collector: M. Ramsey, 9 April 1985 Reference No.: BRIP 14916
<u>5908</u>	Host: grass Locality: Zimbabwe Collector: I. H. Rong, 13 March 1995. Note: Pairings of this strain are fertile with 10 Australian isolates of the same species.		
<i>E. rostratum</i>			
<u>AUT 6658</u>	Host: <i>Zea mays</i> Locality: Florida, USA Collector: T.A. Kucharek, 1972 Reference No.: Luttrell 8868 Mating type A, IMI 197.559, ATCC 32197, CBS 466.75 Note: Mating of this strain (Luttrell 8868) and strain SrA3 identified by K. L. Leonard, provided the teleomorph type.	<u>4130</u>	Host: <i>Rhodora</i> sp. Locality: Mariepskop, South Africa Collector: C. Roux, 1990



<i>E. rostratum</i> (continue)			
6531	Host: <i>Chrysalidocarpus lutescens</i> Locality: Rock Hampton, Australia Collector: Fitzroy Nurseries, Australia Reference No.: BRIP 15403 Note: The strain form typical “halodes” type spores.	6530	Host: <i>Dinebra retroflexa</i> Locality: Lawes, Australia Collector: J.L. Alcorn Reference No.: BRIP 12147
6119	Host: <i>Parotis patens</i> Locality: National Elephant park, Sihangwane, South Africa Collector: I.H. Rong, 10 July 1996 Note: J.L. Alcorn remarked that “halodes” type conidia are formed on WA + straw, but that the strain might form “longirostratum” like conidia on a different medium.		
<i>E. turcicum</i>			
6562	Host: Soil Locality: Donezk, URSS Collector: Unknown Reference No.: I 1318, VKM F-1282	6708	Host: <i>Zea mays</i> Locality: Unknown Collector: Heitman. Reference No.: DSMZ 62618, IMI 11634 Note: Sivanesan (1987) did not list this isolate as one of the numerous IMI samples that he investigated.



<i>E. turcicum</i> (continue)			
AUT 6606	Host: <i>Zea mays</i> Locality: Illinois, USA Collector: L. Hooker Reference No.: ATCC 26306 Note: listed by ATCC as common type isolate; Culture infertile and growth poor.	6575	Host: <i>Sorghum sudanense</i> Locality: Samford, Australia Collector: R. Jones, 6 April 1981 Reference No.: BRIP 13326
5487	Host: Animal feed Locality: Gauteng, South Africa Collector: I.H. Rong 16 November 1994.	5459	Host: <i>Zea mays</i> Locality: Pretoria, South Africa Collector: I.H. Rong, 1994.

Table 8: Morphologic and ontogenic features of selected species.

	Conidiophores	Conidial shape	Curvature	Hilum structure	Conidium size	Germination	Septum ontogeny	Number of septa	Teleomorph
<i>B. cynodontis</i>	Verrucose*	Fusoid* Cylindrical	Slightly curved or straight*	Flush	30-75x10-16	Semiaxial* Vesicles	B*	(3) 7-8 (9)	<i>Cochliobolus</i>
<i>B. ellisii</i>	Smooth	Ellipsoidal * Clavate Pyriform Navicular	Strongly curved or straight	Flush	21-41x12-18	Semiaxial*	B*	3-5	<i>Cochliobolus</i>
<i>B. indica</i>	Smooth*	Clavate Ellipsoidal	Straight	Flush* Often protruding	40-70-17-35	Semiaxial*	E*	(3) 5-7	None reported
<i>B. maydis</i>	Smooth	Fusiform	Curved	Flush	70-160x15-20	Semiaxial*	Not known	5-11	<i>Cochliobolus</i>
<i>B. papendorffii</i>	Verrucose	Navicular Obpyriform	Strongly curved	Flush	30-50x17-30	Semiaxial* Vesicles	B*	3	None reported
<i>B. setariae</i>	Verrucose	Fusiform Navicular	Slightly curved	Flush	(45)50-70(100)x10-15	Semiaxial*	B*	5-10	<i>Cochliobolus</i>
<i>C. affinis</i>	Smooth	Fusiform	Straight or curved	Flush	27-32(49)x8-10(13)	Not known	Not known	4-5; some accentuated	None reported
<i>C. cymbopogonis</i>	Not known	Clavate Ellipsoidal	Sometimes curved	Protruding	35-60x14-20 in culture 30-46x11-17	Not known	Not known	4; some accentuated	<i>Cochliobolus</i>
<i>C. fallax</i>	Not known	Fusiform Ellipsoidal	Slightly curved	Flush	24-26(30)x10-16(12) in culture 24-38(31)x9-15(12)	Not known	Not known	4	None reported
<i>C. lunata</i>	Not known	Clavate Ellipsoidal	Curved	Flush	18-30x9-14 In culture 20-32x9-15	Not known	Not known	3; some accentuated	<i>Cochliobolus</i>
<i>E. inaequale</i>	Smooth	Fusiform Ellipsoidal	Curved	Flush or Protruding	24-32(45)x9-12(16)	Not known	Not known	2-4(6); some accentuated	None reported
<i>E. longirostratum</i>	Not known	Rostrate Obclavate Ellipsoidal	Sometimes curved	Protruding	60-475x12-26	Semi-axially	Not known	Multi-septate; end cells accentuated	None reported
<i>E. rostratum</i>	Verrucose*	Obclavate Rostrate Ellipsoidal	Straight or curved*	Protruding	15-200x7-29	Semi-axially*	E*	18; End cells accentuated	<i>Setosphaeria</i>
<i>E. turcicum</i>	Smooth	Ellipsoidal Obclavate	Slightly curved	Protruding	50-144x180-33	Not known	Not known	4-9	<i>Setosphaeria</i>

Information obtained from Alcorn (1983) and Sivanesan (1987).



Appendix C: Culture based tests - nutrient media and results

1. Acetic acid agar (Paterson & Bridge 1994)

Components	Quantities	Method
Agar (Biolab)	20.0g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Let the medium cool to approximately 60 °C, before 5 ml glacial acetic acid. Using a sterile dispenser decant 10 ml medium was poured into 65 mm Petri dishes and allowed to set.
Distilled water	1 litre	
Glucose	20.0 g	
Yeast extract (Biolab)	5.0 g	

2. Aesculin agar (Paterson & Bridge 1994)

Components	Quantities	Method
Czapek solution A	50.0 ml	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Using a sterile dispenser, decant 20 ml medium was poured into 90 mm plastic Petri dishes and allowed to set.
Czapek solution C	50.0 ml	
Copper solution	1.0 ml	
Zinc solution	1.0 ml	
Sucrose	5.0 g	
Aesculin	3.0 g	
Ferric citrate	0.2 g	
Agar (Biolab)	12.0 g	
Distilled water	900.0 ml	

3. Czapek yeast extract agar (Pitt 1979)

Components	Quantities	Method
K ₂ HPO ₄	1.0 g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Using a sterile dispenser 20 ml medium was poured into 90 mm agar plates and allowed to set.
Czapek concentrate*	10.0 ml	
Yeast extract (Oxoid)	5.0 g	
Sucrose	30.0 g	
Agar (Biolab)	15.0 g	



*Czapek concentrate	
NaNO ₃	30.0 g
KCl	5.0 g
MgSO ₄ .7H ₂ O	5.0 g
FeSO ₄ . 7H ₂ O	0.1 g
Distilled water	100.0 ml

4. Gelatine hydrolysis medium (Paterson & Bridge 1994)

Components	Quantities	Method
Czapek solution A	50.0 ml	Stir gelatine into a small quantity of the distilled water (room temperature). Warm the suspension at 50-60 °C until gelatine dissolves, add all other components. Dispense 10 ml medium into 20 ml McCartney bottles, close and autoclave for 15 minutes at 121 °C (15 p.s.i.).
Czapek solution B	50.0 ml	
Czapek solution C	1.0 ml	
Czapek solution E	1.0 ml	
Sucrose	10.0 g	
Gelatine (uniLAB)	120.0 g	
Distilled water	Add up to 1 litre	

Czapek solution A

Components	Quantities
NaNO ₃	4.0 g
KCl	1.0 g
MgSO ₄ .7H ₂ O	20.0 mg
Distilled water	100.0 ml

Czapek solution B

Components	Quantities
K ₂ HPO ₄	2.0 g
Distilled water	100.0 ml

Czapek solution C

Components	Quantities
ZnSO ₄ .7H ₂ O	1.0 g
Distilled water	100.0 ml

Czapek solution D

Components	Quantities
CuSO ₄ .5H ₂ O	0.5 g
Distilled water	100.0 ml



5. **G25N agar** (Pitt 1979)

Components	Quantities	Method
K ₂ HPO ₄	0.75 g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Using a sterile dispenser, decant 20 ml medium into 90 mm agar plates and allowed to set.
Czapek concentrate [#]	7.5 ml	
Yeast extract (Biolab)	3.7 g	
Glycerol, analytical grade	250 g	
Agar (Biolab)	12 g	
Distilled water	750 ml	

[#] see Appendix C: 3. Czapek concentrate.

6. **Pectin agar** (Paterson & Bridge 1994)

Components	Quantities	Method
NH ₄ H ₂ PO ₄	0.9 g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Aseptically dispense 20 ml medium into 90 mm Petri dishes.
(NH ₄) ₂ HPO ₄	0.2 g	
MgSO ₄ ·7H ₂ O	0.1 g	
KCl	0.5 g	
Citrus pectin (uniLAB)	1.0 g	
Ruthenium red	150.0 mg	
Agar (Biolab)	12.0 g	
Distilled water	1 litre	

7. **Potato carrot agar (PCA)** (Booth 1971)

Components	Quantities	Method
Potato, washed and grated	20.0 g	Boil potato and carrot in water for 1 hour and sieve to remove particles. Use the liquid and make up to 1 litre, add agar and autoclave 15 minutes at 121 °C (15 p.s.i.).
Carrot, washed and grated	20.0 g	
Agar (Biolab)	15.0g	
Distilled water	1 litre	



8. Sach's agar (Hebert 1971)

Components	Quantities	Method
Ca(NO ₃) ₂ .H ₂ O	1.0 g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Aseptically place small pieces of previously autoclaved wheat straw and / or <i>Zea mays</i> leaves on the agar surface after it has been poured into plastic Petri dishes. Allow the plates to set.
K ₂ HPO ₄ .H ₂ O	0.25 g	
KCl	0.25 g	
MgSO ₄ .7H ₂ O	0.25 g	
CaCO ₃	0.85 g	
FeCl ₃	trace	
Agar (Biolab)	20.0 g	
Distilled water	1 litre	

9. Sugar alcohol and glucose medium (Paterson & Bridge 1994)

Components	Quantities	Method
NH ₄ H ₂ PO ₄	1.0 g	Combine components and autoclave for 15 minutes at 121 °C (15 p.s.i.). Add, by filter sterilization, 1 % inositol, 1.01% sorbitol or 1 % glucose so that an equivalent quantity of carbon would be included. Aseptically dispense 10 ml medium into 65 mm plastic Petri dishes and allow setting.
KCL	0.2 g	
MgSO ₄ .7H ₂ O	0.2 g	
Copper solution ^s	1.0 ml	
Zinc solution ^s	1.0 ml	
Agar (Biolab)	12.0 g	
Distilled water	1 litre	

^s see Appendix C: 4c and 4d.



10. Tween 80 agar (Paterson & Bridge 1994)

Components	Quantities	Method
Mycological peptone (Biolab)	10.0 g	Combine components, adjust the pH to 5.4 by adding HCl and dispense into 90 ml aliquots. In a separate container warm 90 ml of the water until approximately 60 - 70 °C and add 10 ml Tween 80. Autoclave the two solutions separately for 15 minutes at 121 °C (15 p.s.i.). When the media have cooled to 60 °C, add 10 ml of the Tween solution to each 90 ml basal medium and mix well. Aseptically dispense 20 ml into 90 mm plastic Petri dishes and allow to set.
NaCl	5.0 g	
CaCl ₂ ·2H ₂ O	0.1 g	
Bromocresol purple (Colour change at pH 5-7)	25.0 mg	
Agar (Biolab)	15.0 g	
Distilled water	1 litre	

11. Vegetable juice agar (Centraalbureau voor Schimmelcultures 1996)

Components	Quantities	Method
Ceres vegetable and fruit concentrate	200 ml	Combine components and adjust pH to 7.3 by adding KOH. Autoclave at 15 minutes at 121 °C (15 p.s.i.).
CaCO ₃	3.0 g	
Agar (Biolab)	15.0 g	
Distilled water	1 litre	

12. Water agar (Booth 1971)

Components	Quantities	Method
Agar	15.0 g	Combine, autoclave for 15 minutes at 121 °C (15 p.s.i.). Aseptically dispense 10 ml in 65 mm Petridishes or 20 ml in 90 mm Petridishes.
Distilled water	1 litre	



Table 9: Efficacy of culture-based tests to group cultures in the correct species as predicted with Foil and DT processing.

	Culture based test / source of inoculum	Total number of measurements	Number of measurements placed correctly with Foil (%)	Number of measurements placed correctly with DR (%)
1	Acetic acid 0.01% / WA	43	21 (54)	91 (52)
2	Acetic acid 0.35% / WA	175	51 (29)	27 (63)
3	Aesculin / WA	70	26 (37)	11(16)
4	Ceres / PCA	68	43 (63)	39 (57)
5	Ceres / WA	178	120 (67)	0 (0)
6	Copper sulphate / WA	22	11 (50)	9 (41)
7	CYE / WA	178	137 (77)	124 (70)
8	G25N / WA	187	112 (60)	91 (49)
9	Gelatine/ WA	176	86 (49)	56 (32)
10	Glucose 1% / WA	184	126 (68)	128 (70)
11	Glucose 1.01% /WA	184	98 (53)	118 (64)
12	Inositol / PCA	202	71 (35)	99 (49)
13	Inositol / WA	184	106 (58)	100 (54)
14	PCA / PCA	40	27 (68)	20 (50)
15	PCA / WA	190	160 (84)	123 (65)
16	Pectin / WA	199	14 (7)	54 (27)
17	Sach / PCA	71	45 (63)	36 (51)
18	Sach / WA	184	145 (79)	117 (64)
19	Sorbitol / WA	190	116 (61)	21 (8)
20	Temperature >20 °C	106	39 (37)	34 (34)
21	Tween growth rates and precipitate / WA	199	125 (63)	98 (49)
22	Tween pH and precipitate / WA	53	26 (49)	25 (47)
23	V8 / PCA	20	14 (70)	11 (55)
24	WA / PCA	56	33 (59)	24 (43)
25	*WA / WA	187	0 (0)	133 (71)



Appendix D: Methods used in nucleic-based characterization

1. Lysis buffer used for DNA extraction

Components	Quantities	Notes
Tris-HCl	150 mM	The pH is 8.8.
EDTA*	50 mM	
SLS#	1 %	

*Ethylenediamine tetra-acetic acid; #Sodium lauroyl sarkosine

2. Tris-EDTA buffer

Components	Quantities	Notes
Tris-HCl	10 mM	The pH is 8.8.
EDTA	0.1 mM	

3. Reaction mixture of PCR for sequencing

	Stock	Final concentration	Amount (:l)
10 x Buffer	10 x	1 x	1.25
MgCl ₂	25.0 mM	2.0 mM	1.0
dNTP*	2.5 mM	0.4 mM	2.0
Primer 1 LR-7 Forward	20.0 :M	0.16 :M	0.1
Primer 2 LR-7 Reverse	20.0 :M	0.16 :M	0.1
TaKaRa <i>Taq</i> #	5U / :l	0.75 U	0.15
H ₂ O			2.9
Template DNA	2.0 ng	10 ng	5.0
TOTAL			12.5

* Deoxynucleotide triphosphates namely dATP, dCTP, dGTP and dTTP; # TaKaRa Biomedicals, Japan: DNA polymerase derived from the thermo-resistant *Thermus aquaticus* (*Taq*) bacterium (Orrego 1990).



4. Reaction mixture of PCR for ISSR's

	Stock	Final concentration	Amount (:l)
10 x Buffer	10 x	1 x	1.25
MgCl ₂	25.0 mM	3.5 mM	1.75
dNTP	2.5 mM	0.4 mM	2.0
Primer *	20.0 :M	0.4 :M	0.5
TaKaRa <i>Taq</i>	5U / :l	0.5 U	0.1
PVP ^s	25 %	2 %	2.5
H ₂ O			2.4
Template DNA	2.0 ng / :l	4 ng	2.0
TOTAL			12.5

* Primers used were DBD-(AC)₇ ; BDB-(CAC)₃ ; DHB- (CGA)₅ ; VHV-GTG TGT GTG TGT GTG. (VHV) = (AGC)(ACT)(AGC). ^sPVP = Polyvinylpyrrolidone.

5. Thermal profile used for both sequencing and ISSR analysis

Steps	Temperature °C (Initial)	Time in seconds
1	94.5, denaturation	90
2	94.5, denaturation	15
3	53.5 ^s , anneal	20
4	72, extension	30
5	72, extension	120
Repeat steps 2 – 4 x 35		

^sISSR annealing temperature 60 °C



6. Abbreviations for nucleic acid base ambiguities (Ting & Manos 1990)

Ambiguity	Possible nucleic acid
M	= A or C
R	= A or G
W	= A or T
S	= C or G
Y	= C or T
K	= G or T
V	= A or C or G
H	= A or C or T
D	= A or G or T
B	= C or G or T
N	= A or C or G or T

Appendix E: List of South African records of *Bipolaris*-like fungi

Bipolaris Shoemaker 1959

Cochliobolus australiensis (Tsuda & Ueyama) Alcorn

= *Pseudocochliobolus australiensis* Tsuda & Ueyama

B. australiensis (M.B. Ellis) Tsuda & Ueyama

= *Drechslera australiensis* (Bugnic.) Subram. & P.C. Jain ex M.B. Ellis.

= *Helminthosporium australiensis* Bugnic. *non rite publ.*

Host	Locality	Reference
Air	Nelspruit, MP	PPRI 3879
<i>Alium cepa</i>	South Africa	PPRI 4234
<i>Avena sativa</i>	South Africa	PPRI 5324
<i>Casuarina</i> seed	Silverton, GP	PPRI 4095
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977); PREM 45170
<i>Citrus sinensis</i> leaves	Tzaneen, NP	PPRI 5122
Dead plants	Vaalharts, NC	PPRI 1067
Dung – Blesbok	Graaff – Reinet, EC	PPRI 4897
Grass roots	Roedtan, NP	PPRI 4578
<i>Ischaemum afrum</i> roots	Radium, NP	PPRI 4582
<i>Medicago sativa</i> seed	Oudtshoorn, WC	Marasas & Bredell (1973); PREM 44951; PPRI 3359
<i>Medicago</i> sp.	Porterville, WC	PREM 48372; PPRI 2045
<i>Nicotiana tabacum</i> leaves	Rustenburg, NW	PPRI 5464, 5465;
<i>Panicum laevifolium</i>	Heilbron, FS	PREM 44942
<i>Parotis patens</i> leaf bracts	Tembe Elephant Park, Sihangwane, KZN	PPRI 6109
Pasture grass	South Africa	PPRI 6151
<i>Salvia stenophylla</i> seed	Stellenbosch, WC	PPRI 7049
Soil <i>Acacia</i> veld	Potchefstroom, NW	PPRI 3330
Soil near <i>Aspalathus</i> <i>linearis</i>	Clanwilliam, WC	PPRI 5549
Soil cotton field	Groblersdal, MP	PPRI 5466
<i>Tribulus terrestris</i>	Middelburg, EC	PREM 44795
<i>Triticum aestivum</i> seeds	South Africa	Lübben 1992
<i>Triticum</i> sp. debris	Heilbron, FS	PREM 45013



Co. bicolor A.R. Paul & D.G. Parbery

B. bicolor (Mitra) Shoemaker.

= *H. bicolor* Mitra

= *D. bicolor* (Mitra) Subram. & P.C. Jain

= *H. bhawanii* A.P. Misra non rite publ.

= *D. bhawanii* O. Prakash & A.P. Misra

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Rustenburg, NW	Gorter (1982); PREM 44977, 45139
<i>Cenchrus ciliaris</i>	Roodeplaar, GP	Bezuidenhout (1977)
<i>Cenchrus ciliaris</i>	GP, MP, NP and NW	Crous <i>et al.</i> (2000)
Grass	Hartbeeshoek	PPRI 6147 [#]
Mango fruit	Pretoria, GP	PPRI 7050
<i>Medicago sativa</i> seed	Oudtshoorn, WC	Marasas & Bredell (1973); PREM 44950
<i>Panicum laevifolium</i>	Rusthof, FS	PREM 44926
<i>Sorghum bicolor</i> subsp. <i>arundinaceum</i> (= <i>S. verticilliflorum</i>)	Widespread	Putterill 1954
<i>Sorghum caffrorum</i>	Potchefstroom, NW	PREM 47227
<i>Sorghum halepense</i>	Pretoria, GP	Putterill (1954); PREM 30432
<i>Triticum aestivum</i>	Clarens, FS	PREM 30458
<i>Triticum aestivum</i>	Bethlehem, FS	Putterill (1954); PREM 30496

B. brizae (Y. Nisik.) Subram. & P.C. Jain

= *H. brizae* Y. Nisik.

= *D. brizae* (Y. Nisik.) Subram. & P.C. Jain

Host	Locality	Reference
<i>Briza maxima</i>	Port Elizabeth, EC	Putterill (1954); PREM 28530
<i>Briza</i> spp.	South Africa	McKenzie (1992)



Co. nisikadoi (Tsuda, Ueyama & Y. Nisik.) Alcorn

= *P. nisikadoi* Tsuda, Ueyama & Nisik.

**B. coicis* (Y. Nisik.) Shoemaker

= *H. coicis* Y. Nisik.

= *Curvularia coicis* E. Castell.

= *D. coicis* (Y. Nisik.) Subram. & P.C. Jain.

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaar, GP	PREM 45150

B. crustacea (Henn.) Alcorn

= *H. crustaceum* Henn.

Host	Locality	Reference
<i>Sporobolus africanis</i>	South Africa	SBML (2001)
<i>Sporobolus capensis</i>	Tweedie, KZN	Doidge (1950); PREM 9764 [†]
<i>Sporobolus capensis</i>	Soutpansberg, NP	PREM 1826 [†]
<i>Sporobolus fimbriatus</i>	Balgowan, KZN	Sivanesan (1987); PREM 23390; IMI 296455 (SBML 2001)
<i>Sporobolus pyramidalis</i>	Donnybrook, KZN	Doidge (1950); PREM 29835
<i>Sporobolus pyramidalis</i>	Krugersdorp, GP	PREM 35543

*Note: Specimens also contain *B. ravenelii*

Coch. cynodontis R.R. Nelson

B. cynodontis (Marignoni) Shoemaker

= *H. cynodontis* Marignoni

= *D. cynodontis* (Marignoni) Subram. & P.C. Jain

Host	Locality	Reference
<i>Azolla filliculoides</i>	Grahamstown, EC	PPRI 6794
<i>Cynodon bradleyi</i>	Brooklyn, GP	PREM 30242; PREM 29976
<i>Cynodon bradleyi</i>	Redan, EC	Putterill (1954)
<i>Cynodon dactylon</i> leaf spot	EC, WC, KZN and "Transvaal"	Doidge <i>et al.</i> (1953); Gorter (1981)
<i>Cynodon dactylon</i>	Pilgrims Rest, MP	Putterill (1954); PREM 27359
<i>Cynodon incompletus</i>	Middelburg, EC	Roux and Van Warmelo (1997)
<i>Eragrostis</i> sp. hay	Humansdorp, EC	PPRI 6182
<i>Eragrostis</i> sp. hay	Grobliersdal, MP	PPRI 6158
<i>Trachus koelroides</i> debris	Middelburg, EC	PPRI 4889
<i>Triticum aestivum</i>	Heilbron, FS	PREM 44898, 44897
<i>Vigna unguiculata</i>	Roodeplaat, GP	PPRI 6185 [#]

Co. hawaiiensis Alcorn

= *P. hawaiiensis* (Alcorn) Tsuda & Ueyama

B. hawaiiensis (M.B. Ellis) J.Y. Uchida & Aragaki

= *D. hawaiiensis* M.B. Ellis

= *H. hawaiiensis* Bugnic.

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Dendron, NP	PREM 45540
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Cynodontis incompletus</i>	Middelburg, EC	Roux and Van Warmelo (1997)
Fodder	Tshipise, NP	PPRI 5159
<i>Lupinus</i> sp.	WC	Crous <i>et al.</i> (2000); PREM 45331
Mango leaves	Lisbon Estates, MP	PPRI 5325
<i>Triticum aestivum</i> seeds	South Africa	Lübben (1992)



***B. indica** J.N. Rai, Wadhvani & J.P. Tewari

= *D. indica* (J.N. Rai, Wadhvani & J.P. Tewari) Mouch.

= *D. boeremae* A.S. Patil & V.G. Rao

Host	Locality	Reference
Fodder	Lichtenburg, NW	PPRI 6155
<i>Parotis patens</i> roots	Tembe Elephant Park, Sihangwane, KZN	PPRI 6111
Soil	Vioolsdrift, NC	PPRI 4239

B. leersiae (G.F. Atk.) Shoemaker

= *H. leersiae* G.F. Atk.

= *D. leersiae* (G.F. Atk.) Subram. & P.C. Jain

Host	Locality	Reference
<i>Leersia hexandra</i>	Nottingham Road, KZN	Putterill (1954), PREM 33115
<i>Setaria</i> sp.	Nottingham Road, KZN	Putterill (1954); PREM 33116

Co. heterostrophus (Drechsler) Drechsler

= *Ophiobolus heterostrophus* Drechsler

B. maydis (Y. Nisik. & C. Miyake) Shoemaker

= *H. maydis* Y. Nisik. & C. Miyake

= *D. maydis* (Y. Nisik. & C. Miyake) Subram. & P.C. Jain

Host	Locality	Reference
Debris	Berg-en-Dal Rest camp, Kruger National Park, MP	PPRI 4240
Grass	Jozini, KZN	PPRI 2957
<i>Zea mays</i>	Hillcrest, KZN	PREM 45753; PPRI 3331
<i>Zea mays</i> seed and leaves	Lydenburg, MP	Gorter (1977, 1979); PREM 44938, 44980
<i>Zea mays</i>	Komatipoort, MP	PREM 45080
<i>Zea mays</i>	Pietermaritzburg, KZN	PREM 45032, 45033, 45089



B. mediocris (K.M. Putterill) Shoemaker

= *H. mediocre* K.M. Putterill

= *D. mediocris* (K.M. Putterill) Subram. & P.C. Jain as *D. "mediocre"*

Host	Locality	Reference
<i>Pennisetum clandestinum</i>	Schagen, MP	Putterill (1954); PREM 30756 Type

B. micropus (Drechsler) Shoemaker

= *H. micropum* Drechsler

= *H. leptochloae* Y. Nisik. & C. Miyake

Host	Locality	Reference
<i>Zea mays</i>	Klipdrift, GP	PPRI 4689

B. miyakei (Y. Nisik.) Shoemaker

= *H. miyakei* Y. Nisik.

= *D. miyakei* (Y. Nisik.) Subram. & B.L. Jain

Host	Locality	Reference
<i>Eragrostis curvula</i>	Pietermaritzburg, KZN	Gorter (1979); PREM 7761

B. multiformis (Jooste) Alcorn

= *D. multiformis* Jooste (Alcorn 1983)

Host	Locality	Reference
<i>Tribulus terrestris</i>	Middelburg, EC	Jooste (1975); PPRI 3367

B. nicotiae (Mouch.) Alcorn (Alcorn 1983)

= *D. nicotiae* Mouch.

Host	Locality	Reference
Fodder	Lichtenburg, NW	PPRI 6155 [#]
Soil	Vioolsdrift, NC	PPRI 4239 [#]



Co. nodulosus Luttr.

B. nodulosa (Berk. & M.A. Curtis) Shoemaker

= *H. nodulosum* Berk. & M.A. Curtis

= *H. nodosum* Berk. & M.A. Curtis

= *H. leucostylum* Drechsler

= *B. leucostyla* (Drechsler) Shoemaker

= *D. nodulosa* (Berk. & M.A. Curtis) Subram. & P.C. Jain

Host	Locality	Reference
<i>Aestivum sativum</i> hay	Porterville, WC	PPRI 6196
<i>Cenchrus ciliaris</i>	Moedville, NW	PREM 45343
<i>Eleusine coracana</i> subsp. <i>africana</i> (= <i>E. africana</i>)	Heilbron, FS	PREM 44745, 44899
<i>Eleusine indica</i>	White River, MP; Vereeniging GP; Ladysmith, KZN	Putterill (1954); PREM 23689, 25908, 10036
<i>Eleusine</i> spp.	KZN; "Transvaal"	Gorter (1981)
<i>Eriocephalus cricoides</i> debris	Middelburg, EC	PPRI 4886
<i>Gossypium hirsutum</i> seeds	Limpopo river, NP	PPRI 6808
<i>Sorghum vulgare</i>	NW	PREM 47234

Co. miyabeanus (S. Ito & Kurib.) Drechsler ex Dastur

= *O. miyabeanus* S. Ito & Kurib

B. oryzae (Breda de Haan) Shoemaker.

= *H. oryzae* Breda de Haan

= *H. oryzae* Miyabe & Hori

= *D. oryzae* (Breda de Haan) Subram. & P.C. Jain

= *Luttrellia oryzae* (Breda de Haan) Gornostai

Host	Locality	Reference
<i>Oryza sativa</i>	Middelburg, MP	Gorter (1977)
<i>Oryza sativa</i>	GP, MP, NP and NW	Crous <i>et al.</i> (2000)



***B. papendorffii* (Aa) Alcorn**

= *C. siddiquii* S. Ahmad & Quraishi

= *C. papendorffii* Aa

= *D. papendorffii* (Aa) M.B. Ellis

Host	Locality	Reference
<i>Acacia karroo</i> leaf-litter	Potchefstroom, NW	Van der Aa (1967)
Air	Mariepskop, NP	PPRI 4094
<i>Cenchrus ciliaris</i>	Roodeplaas, GP	Bezuidenhout (1977); PREM 45149
<i>Citrus sinensis</i> leaves	Tzaneen, NP	PPRI 5342
<i>Cynodontis incompletus</i>	Middelburg, EC	Roux 1997
Grass	Leeudoringstad, NW	PPRI 5852
Grass	Onderstepoort, GP	PPRI 5852
Grass	Pretoria, GP	PPRI 6314
<i>Oryza</i> sp.	Levubu, NP	PREM 45026
Soil under <i>Acacia karroo</i>	Potchefstroom, NW	Papendorf (1976)
Soil under <i>Acacia karroo</i>	KZN	PPRI 3830
<i>Sorghum vulgare</i> seed	Lichtenburg, NW	PREM 47232
Teff	South Africa	PPRI 5667
<i>Tribulus terrestris</i>	Middelburg, EC	PREM 45466
<i>Triticum aestivum</i> seed	South Africa	Lübben 1992
<i>Vigna unguiculata</i>	Roodeplaas, GP	PPRI 6124 [#]

***B. priskaensis* W.Q. Chen & W.J. Swart (Chen, Swart & Niewoudt 2000)**

Host	Locality	Reference
<i>Pistachia vera</i>	Prieska, NC	Chen <i>et al.</i> (2000); PREM 56306 Holotype; PPRI 6806 ex-Type



Co. ravenelii Alcorn

B. ravenelii (M.A. Curtis) Shoemaker

= *Heterosporium callospermum* Speg. (Shoemaker 1959)

= *H. crustaceum* Henn. (Shoemaker 1959)

= *H. ravenelii* M.A. Curtis

= *H. hoffmanii* Berk.

= *Napicladium ravenelii* (M.A. Curtis) Speg.

= *H. tonkinense* P. Karst. & Roum.

= *D. ravenelii* (M.A. Curtis) Subram. & P.C. Jain

Host	Locality	Reference
<i>Sporobolus africanus</i> (as <i>S. capensis</i>)	Widespread	Gorter (1981); PREM 1453, 1826 ^s , 2201, 6692, 6921, 9769 ^s , 10065, 10097, 11643, 20371, 31783, 40533, 45730
<i>S. fimbriatus</i>	Kentani, KZN	Doidge (1950); Putterill (1954); PREM 6667
<i>S. pyramidalis</i>	Nelspruit, MP	PREM 57261
<i>S. pyramidalis</i>	Schagen, MP	PREM 32909
<i>S. pyramidalis</i>	Lydenburg, MP	Doidge (1950); PREM 26093
<i>Sporobolus</i> sp.	Schagen, MP	PREM 47603

Note: ^s Specimens also contain *B. crustacea*

B. sacchari (E.J. Butler) Shoem.

= *H. sacchari* E.J. Butler

= *D. sacchari* (E.J. Butler) Subram. & P.C. Jain

Host	Locality	Reference
<i>Aspalathus linearis</i> seed	Clanwilliam, WC	PPRI 5399
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Saccharum officinarum</i> seed	Northern areas of KZN	Gorter (1977)
<i>Saccharum officinarum</i> seed	Mt. Edgecombe, KZN	Putterill (1954); PREM 30245, 30988



Co. setariae (S. Ito & Kurib.) Drechsler ex Dastur

= *O. setariae* S. Ito & Kurib.

B. setariae (Sawada) Shoemaker

= *H. setariae* Sawada

= *D. setariae* (Sawada) Subram.

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	PREM 45151
<i>Cynodon</i> sp.	South Africa	McKenzie (1992); SBML (2000)
<i>Persea</i> sp	NP	Crous <i>et al.</i> (2000)

B. sorghicola (Lefebvre & Sherwin) Alcorn

= *H. sorghicola* Lefebvre & Sherwin

= *D. sorghicola* (Lefebvre & Sherwin) M.J. Richardson & E.M. Fraser

Host	Locality	Reference
<i>Parotis patens</i>	Tembe Elephant Park, Sihangwane, KZN	PPRI 6118
<i>Sorghum vulgare</i>	NP	PREM 45019
<i>Sorghum vulgare</i> seed	Lichtenburg, NW	PREM 4723
<i>Sorghum caffrorum</i> seed	Lichtenburg, NW	PREM 47237
<i>Zea mays</i>	Buffelspoort, NW	PPRI 4690



Co. sativus (S. Ito & Kurib.) Drechsler ex Dastur

= *O. sativus* S. Ito & Kurib.

B. sorokiniana (Sacc.) Shoemaker

= *H. sorokinianum* Sacc.

= *H. sativum* Pammel

= *H. acrothecioides* Lindf.

= *H. californicum* Mackie & G. E. Paxton

= *D. sorokiniana* (Sacc.) Subram. & P.C. Jain

Host	Locality	Reference
<i>Acacia karroo</i>	Potchefstroom, NW	PREM 43015, 43018, 42062, 43062
<i>Hordeum vulgare</i> leaves, roots and seeds	WC, FS and "Transvaal"	Gorter (1977)
<i>Hordeum</i> sp.	Grahamstown, EC; Louis Trichardt, NP; Lydenburg, MP	Putterill (1954); PREM 258901, 30857, 30858, 30859, 30860
<i>Panicum</i> sp.	Humansdorp, EC	PPRI 6180 [#]
<i>Triticum aestivum</i> roots and seed	"Cape", FS and "Transvaal"	Gorter (1977)
<i>Triticum aestivum</i> seeds	South	Lübben (1992); PPRI 1026
<i>Triticum vulgare</i>	Bethlehem, FS; Lydenburg, MP	Putterill (1954); PREM 30990, 30991, 30493, 30421



Co. spicifer R.R. Nelson

= *P. spicifer* (R.R. Nelson) Tsuda

B. spicifera (Bainier) Subram.

= *Brachycladium spiciferum* Bainier

= *H. tetramera* McKinney

= *C. spicifera* (Bainier) Boedijn

= *H. spiciferum* (Bainier) Nicot

= *C. tetramera* (McKinney) Boedijn ex J.C. Gilman

= *B. tetramera* (McKinney) Shoemaker

= *D. tetramera* (McKinney) Subram. & P.C. Jain.

= *D. spicifera* (Bainier) Arx

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	PREM 45173
<i>Citrus</i> sp.	Letaba Estate, Tzaneen, NP	PPRI 5107
<i>Cynodon transvaalensis</i>	Johannesburg, GP	Putterill (1954); PREM 30246
Debris	D'Nyala Provincial Nature Reserve, NP	PPRI 3824
<i>Eragrostis</i> sp. hay	Humansdorp, EC	PPRI 6184
Groundnuts	Vaalharts, NC	PPRI 3766
Soil and plant debris	Uppington, NC	PREM 47830
Soil under <i>Acacia karroo</i>	Potchefstroom, NW	Papendorf (1976)
<i>Triticum aestivum</i> seeds	South Africa	Lübber (1992)
<i>Triticum</i> sp.	Bethlehem, FS	Putterill (1954); PREM 30494
<i>Triticum</i> sp.	WC	Crous <i>et al.</i> (2000)



C. stenospilus Matsumoto & W. Yamamoto, *nom. inval.* (SBML 2001)

B. stenospila (Drechsler) Shoemaker.

= *H. stenospila* Drechsler

= *D. stenospila* (Drechsler) Subram. & P.C. Jain

Host	Locality	Reference
<i>Saccharum officinarum</i> stems	Mt. Edgecombe, KZN	Gorter (1977)

B. urochloae (K.M. Putterill) Shoemaker

= *H. urochloae* K.M. Putterill

= *D. urochloae* (K.M. Putterill) Subram. & P.C. Jain

Host	Locality	Reference
Onion seed	Oudshoorn, WC	PPRI 3358
Onion seed	Beaufort West, WC	
Onion seed	Pretoria, GP	PREM 44946, 4985, 44983
Soil and debris from cotton-field	Groblersdal, MP	PPRI 5494
<i>Urochloa panicoides</i> (= <i>U. helopus</i> Crous et al. 2000)	Barberton, MP	Putterill (1954); PREM 26148 Holotype
<i>Urochloa panicoides</i> (= <i>U. helopus</i> Crous et al. 2000)	Schagen, MP	Putterill (1954); PREM 26182 Paratype



Co. victoriae R.R. Nelson

B. victoriae (F. Meehan & H.C. Murphy) Shoemaker

= *H. victoriae* F. Meehan & H.C. Murphy

= *H. sativum* Pammel, J.E. King & Bakke var. *victoriae* (F. Meehan & H.C. Murphy)

H.R. Rosen

= *D. victoriae* (F. Meehan & H.C. Murphy) Subram. & P.C. Jain.

Host	Locality	Reference
<i>Triticum aestivum</i> seeds	South Africa	Lübber (1992)
Soil under <i>Acacia karroo</i>	Potchefstroom, NW	Papendorf (1976)

Co. carbonum R.R. Nelson

B. zeicola (G. L. Stout) Shoemaker.

= *H. zeicola* G.L. Stout

= *H. carbonum* Ullstrup

= *D. zeicola* (G. L. Stout) Subram. & P.C. Jain.

= *D. carbonum* (Ullstrup) Sivan.

Host	Locality	Reference
<i>Pennisetum glaucum</i>	KZN	Crous <i>et al.</i> (2000)
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Cynodontis incompletus</i>	Middelburg, EC	Roux and Van Warmelo (1997)
<i>Zea mays</i> leaves	Derdepoort, GP; Carltonville, GP; Ventersdorp, NW; Potchefstroom, NW; Delmas, MP; Roodeplaat, GP; Delmas, MP; Springbok flats, NP	Gorter (1979); PREM 45079, 44683, 45045, 45171, 45572; PPRI 5461, 6201, 3362
<i>Triticum aestivum</i> seeds	South Africa	Lübber (1992)
<i>Triticum aestivum</i> seeds	Springbok flats, NP	Gorter (1977)
<i>Triticum aestivum</i> seeds	KZN	Crous <i>et al.</i> (2000)



***Curvularia* Boedijn 1933**

= *Curvisporium* Corbetta 1963

= *Acrotheciella* Koord.1907

= *Malustella* Batidys & J.A. Lima 1960.

***C. affinis* Boedijn**

Host	Locality	Reference
<i>Ipomoea batatas</i>	Levubu, NP	PPRI 5861
<i>Zea mays</i>	Klipdrift, GP	PPRI 7051

***C. borrieriae* (Viégas) M.B. Ellis**

= *H. borrieriae* Viégas

= *C. borrieriae* (Viégas) Martin apud Viégas *nom. inval.* (Art. 33.2)

Host	Locality	Reference
<i>Citrus cinensis</i> leaves	Letsitele, NP	PPRI 5109
Debris	Ozwatini Plateau, Greytown, KZN	PPRI 3820

Note: The initials of Martin, co author of the name *C. borrieriae* (Viégas) Martin apud Viégas, could not be verified since the original publication was not available and subsequent publications referred to the name as above (Ellis 1966; Sivanesan 1987).

***C. brachyspora* Boedijn**

Host	Locality	Reference
Debris	Uitsoek trail, MP	PPRI 4060
Moss	Mariepskop, NP	PPRI 4096
<i>Panicum laevifolium</i>	Heilbron, FS	PREM 44931; PPRI 3343
<i>Pinus patula</i> shoots	Rhenosterhoek, NW	Van der Westhuizen (1955)
Soil cotton field	Groblersdal, MP	PPRI 5463



C. clavata P.C. Jain

Host	Locality	Reference
<i>Aspalathus linearis</i>	Clanwilliam, WC	PPRI 5212
<i>Brachychloa</i> leaf bracts	Tembe Elephant Park, Sihangwane, KZN	PPRI 6120
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Citrus cinensis</i> leaves	Tzaneen, NP	PPRI 5108
<i>Panicum coloratum</i> phyllplane of / and litter	Delmas, MP	Eicker (1976)
<i>Triticum aestivum</i> seeds	South Africa	Lübben (1992)
<i>Triticum aestivum</i> seeds	Heilbron, FS	PPRI 3344

Co. cymbopogonis J.A. Hall & Sivan.

C. cymbopogonis (C.W. Dodge) J.W. Groves & Skolko

= *H. cymbopogonis* C.W. Dodge

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout 1977
<i>Hyparrhenia quarrei</i>	Royal Natal National Park, KZN	PPRI 6273 [#]
<i>Zea mays</i>	Klipdrift, GP	PPRI 6633 [#]

C. eragrostidis (Tsuda & Ueyama) Sivan.

= *P. eragrostidis* Tsuda & Ueyama

C. eragrostidis (Henn.) J.A. Meyer

= *Brachysporium eragrostidis* Henn.

= *Spondylocladium maculans* C.K. Bancr.

= *C. maculans* (C.K. Bancr.) Boedijn

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
Grass	Beech Wood, KZN	PPRI 3221
Grass	Severn, NW	PPRI 5666
<i>Triticum aestivum</i> seeds	South Africa	Lübben (1992)
<i>Pinus patula</i> shoots	Louis Trichardt, NP	Van der Westhuizen (1955)



Co. geniculatus R.R. Nelson

= *P. geniculatus* (R.R. Nelson) Tsuda, Ueyama & Nishihara

**C. geniculata* (Tracy & Earle) Boedijn

= *Helminthosporium geniculatum* Tracy & Earle

= *Brachysporium sesami* Sawada

Host	Locality	Reference
Avocado leaves	Tzaneen, NP	PPRI 3114

C. harveyi Shipton

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
Debris	Uitsoek trail, MP	PPRI 4059

Co. intermedius R.R. Nelson

C. intermedia Boedijn

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
Debris	Mariepskop, NP	Sinclair, Eicker and Morgen-Jones (1984)



Co. lunatus R.R. Nelson & F.A. Haasis as *Co. "lunata"*

= *P. lunatus* R.R. Nelson & F.A. Haasis) Tsuda, Ueyama & Nisihih.

C. lunata (Wakker) Boedijn

= *Acrothecium lunatum* Wakker

= *H. caryopsidum* Sacc.

= *H. sudanensis* Cif. & Gonz. Frag.

= *C. caryopsidum* (Sacc.) Teng

Host	Locality	Reference
Avocado flower buds	Nelspruit, MP	PPRI 5606
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Gladiolus</i> sp.	South Africa	SBML (2000); BPI 443711
L.M. lawn	Roodeplaat, GP	PPRI 6099 [#]
<i>Lupinus</i> sp.	WC	Crous <i>et al.</i> (2000)
Mango leaves	Hazyview, MP	PPRI 5331
<i>Tribulis terrestris</i>	Oudtshoorn, WC	PPRI 3360 [#]
<i>Triticum aestivum</i>	Bethlehem, FS	Sivanesan (1987); PREM 30495
<i>Triticum aestivum</i> seeds	South Africa	Lübben (1992)
Unknown plant leaves	Mariepskop, NP	PPRI 4137

Co. pallescens (Tsuda & Ueyama) Sivan.

= *P. pallescens* Tsuda & Ueyama

C. pallescens Boedijn

= *C. leonensis* M.B. Ellis

Host	Locality	Reference
<i>Aspalathus linearis</i> seed	Clanwilliam, WC	PPRI 5418
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Citrus cinensis</i> leaves	Tzaneen, MP	PPRI 5121
Dung – Golden Pheasant	Pretoria, GP	PPRI 3395
Grass	Pretoria, GP	PPRI 6313
<i>Pinus patula</i>	Sabie, MP	Van der Westhuizen (1955)



**C. senegalensis* (Speg.) Subram.

= *C. senegalensis* (Speg.) Muntoñola, nom. illeg. (Art. 63)

= *Brachyspora senegalense* Speg.

= *Acrothecium falcatum* Tehon

= *C. falcata* (Tehon) Boedijn (as *C. "flacata"*)

Host	Locality	Reference
Wheat straw	Heilbron, FS	PPRI 1091

C. stapeliae (du Pless.) S.J. Hughes & du Pless.

= *Triposporium stapeliae* du Pless. (Ellis 1966)

Host	Locality	Reference
<i>Huernia oculata</i>	Stellenbosch, WC	Hughes (1951); <u>Alcorn</u> (1990); PREM 46707
<i>Stapelia schinzii</i>	Stellenbosch, WC	PREM 46710, 46712, 46713
<i>Stapelia</i> spp.	Stellenbosch, WC	PREM 46710, 46712, 46713
<i>Tavaresia grandiflora</i>	Stellenbosch, WC	PREM 46709
<i>Trichocaulon cactiforme</i>	Stellenbosch, WC	Hughes 1951, PREM 46708

Co. tuberculatus Sivan.

* *C. tuberculata* P.C. Jain

Host	Locality	Reference
Soil around <i>Acacia karroo</i>	Potchefstroom, NW	PPRI 3240

C. trifolii (Kauffmann) Boedijn

= *Brachysporium trifolii* Kauffmann

= *Blennoria trifolii* Bonar nom. nud. (SBML 2000)

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977)
<i>Gladiolus hortulanus</i> stem	Barberton, MP	Gorter (1977)
<i>Zea mays</i>	Springs, GP	Marasas <i>et al.</i> (1966)



Co. verruculosus (Tsuda & Ueyama) Sivanesan

= *P. verruculosus* Tsuda & Ueyama

**C. verruculosa* M.P. Tandon & Bilgrami ex M.B. Ellis

= *C. verruculosa* M.P. Tandon & Bilgrami *nom inval.* (Art. 37)

Host	Locality	Reference
<i>Eragrostis hay</i>	Humansdorp, EC	PPRI 6183
<i>Ipomoea batatas</i>	Groblersdal, MP	PPRI 6162
<i>Portulaca</i> sp.	Karoo National Reserve, Graaff-Reinet, EC	PPRI 4894

Exserohilum K.J. Leonard & Suggs 1974

Setosphaeria holmii (Luttr.) K.J. Leonard & Suggs

= *Trichometasphaeria holmii* Luttr.

= *Keissleriella holmi* (Luttr.) Arx

E. holmi (Luttr.) K.J. Leonard & Suggs

= *H. holmii* Luttr.

= *D. holmii* (Luttr.) Subram. & P.C. Jain

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977); PREM 45152

**E. longirostratum* (Subram.) Sivan.

= *H. longirostratum* Subram.

= *B. longirostratum* (Subram.) Subram.

= *D. longirostratum* (Subram.) Subram.

Host	Locality	Reference
<i>Musa</i> sp.	Nelspruit, MP	PPRI 5133 [#]

S. monoceras Alcorn

E. monoceras (Drechsler) K.J. Leonard & Suggs

= *H. monoceras* Drechsler

= *B. monoceras* (Drechsler) Shoemaker

= *D. monoceras* (Drechsler) Subram. & P.C. Jain

= *L. monoceras* (Drechsler) Khokhr.

Host	Locality	Reference
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977), PREM 45179

S. pedicellata (R.R. Nelson) K.J. Leonard & Suggs

= *T. pedicellata* R.R. Nelson

E. pedicellatum (A.W. Henry) K.J. Leonard & Suggs

= *H. pedicellatum* Henry

= *B. pedicellata* (Henry) Shoemaker

= *D. pedicellata* (Henry) Subram. & P.C. Jain.

Host	Locality	Reference
Soil and <i>Zea mays</i> debris in cotton field	Groblersdal, MP	PPRI 6160
<i>Zea mays</i>	Settlers, NP	PPRI 1047
<i>Zea mays</i>	Ventersburg, FS	PREM 45765; PPRI 3333
<i>Zea mays</i> roots	Potchefstroom, NW	PPRI 5087
<i>Zea mays</i>	FS and "Transvaal"	Gorter (1977)
<i>Zea mays</i>	Roodeplaat, GP	Marasas <i>et al.</i> (1966); PREM 42940

S. prolata K. J. Leonard & E.G. Suggs

E. prolatum K.J. Leonard & E.G. Suggs

Host	Locality	Reference
<i>Musa</i> sp.	Nelspruit, MP	PPRI 5134

S. rostrata K.J. Leonard

E. rostratum (Drechsler) K.J. Leonards & E.G. Suggs

= *H. halodes* Drechsler

= *H. rostratum* Drechsler

= *H. halodes* Drechsler var. *tritici* Mitra

= *H. halodes* Drechsler var. *elaeidicola* Kovachich

= *B. halodes* (Drechsler) Shoemaker.

= *B. rostrata* (Drechsler) Shoemaker.

= *D. halodes* (Drechsler) Subram. & P.C. Jain.

= *H. appaterrae* K.S. Deshpande & K.B. Deshpande

= *D. rostrata* (Drechsler) M.J. Richardson & E.M. Fraser

= *E. halodes* (Drechsler) K.J. Leonards & E.G. Suggs

= *L. rostrata* (Drechsler) Gonorstai

Host	Locality	Reference
Animal feed	Onderstepoort, GP	PPRI 3392, 5149
Bananas	Nelspruit, GP	PPRI 5483
<i>Brachyachloa</i> leaf bracts	Tembe Elephant Park, Sihangwane, KZN	PPRI 6119
<i>Cenchrus ciliaris</i>	Roodeplaat, GP	Bezuidenhout (1977); PREM 45172
<i>Chrysalidocarpus leitescens</i>	Tongaat, KZN	PREM 47561
<i>Citrus sinensis</i> leaves	Tzaneen, NP	PPRI 5105
<i>Cynodontis incompletus</i>	Middelburg, EC	Roux and Van Warmelo (1997)
Debris	D`Nyala Nature Reserve, NP	PPRI 3817
<i>Eragrostis lehmanniana</i> debris and soil from	Middelburg, EC	PPRI 4874
Fodder	Lichtenburg, NW	PPRI 6154
Kikuyu grass	Pretoria, GP	PPRI 4852
L.M. lawn	Roodeplaat, GP	PPRI 6148
<i>Medicago sativa</i> seed	Ladysmith, KZN	PREM 44525, 44527
<i>Panicum</i> hay	Humansdorp, EC	PPRI 6178
<i>Rhodora</i> fern	Mariepskop, NP	PPRI 4130
<i>Saccharum officinarum</i>	KZN	PREM 32488
Unknown mangrove plant seeds	Pietermaritzburg, KZN	PPRI 5904

Host	Locality	Reference
<i>Setaria incompressa</i> roots	Morolong, NP	PPRI 4588
Soil Cotton field	Groblersdal, MP	PPRI 5460, 5462, 5489
<i>Sorghum caffrorum</i> seed	NP	PREM 47224, 47238
<i>Triticum aestivum</i>	Bethlehem, FS	Putterill (1954); PREM 30456, 30460
<i>Triticum aestivum</i> seeds	South Africa	Lübben (1992)
<i>Triticum</i>	Brits, NW	Putterill (1954); PREM 30434
<i>Zea mays</i>	Pretoria, GP	PREM 47494; PPRI 1025, 3346
<i>Zea mays</i>	Bloemfontein, FS	PREM 44659

S. turcica (Luttr.) K.J. Leonard & E.M. Suggs

= *T. turcica* Luttr.

= *Keissleriella turcica* (Luttr.) Arx

E. turcicum (Pass.) K.J. Leonard & E. M. Suggs

= *H. turcicum* Pass.

= *H. inconspicuum* Cooke & Ellis

= *B. turcica* (Pass.) Shoemaker

= *D. turcica* (Pass.) Subram. & P.C. Jain

= *L. turcica* (Pass.) Khokhr.

Host	Locality	Reference
<i>Pennisetum glaucum</i>	KZN	Crous <i>et al.</i> (2000)
<i>P. typhoides</i>	KZN	Crous <i>et al.</i> (2000)
Pigs feed	GP	PPRI 5487
<i>S. halepense</i>	Ashburton KZN; Prinshof, GP	Putterill (1954); PREM 28600, 30431, 30432, 30710, 10099
<i>S. sudanense</i> leaves and seeds	Pietermaritzburg KZN; Cedara KZN; Prinshof, GP	Putterill (1954); PREM 15448, 15462, 30709
<i>S. verticilliflorum</i> leaves	KZN and "Transvaal"	Doidge (1950); Gorter (1981)



Host	Locality	Reference
<i>S. verticilliflorum</i> leaves	Ficksburg, FS	PREM 42548
<i>S. verticilliflorum</i> leaves	Dalton, KZN; Prinshof, GP	Putterill (1954); PREM 30708, 9729
<i>Sorghum caffrorum</i> leaves & seeds	Bloemfontein, FS	Doidge (1950); PREM 31789
<i>Zea mays</i>	Cedara, KZN; Naboomspruit, NP	Putterill (1954); PREM 2187, 20386
<i>Zea mays</i> on leaves	Widespread	Gorter (1977)



Appendix F: ANALYSIS OF SPORE IMAGES

Table 10: Group separation table of FOIL analysis using the variables medium, day, temperature, roundness, ferret diameter and compactness.

	Total	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	40	30						3	4	1		2			
B	16		3			2		3		4	3	1			
C	36	1		28		1			3				1	1	1
D	24	2		1	11	2	1						3	3	1
E	27	2	1	6		14			2			2			
F	14				1		2						5	4	2
G	29							16		7	6				
H	39	16		1	2	1	2		10			1	2	2	2
I	43			2				13		21	7				
J	45	1		1	1			14		16	11		1		
K	40	9	2	2		3		4	5	6	2	6	1		
L	44	2		2	5								23	9	3
M	29				6		1						7	13	2
N	22				3								5	6	8

A = *B. cynodontis*; B = *B. ellisii*; C = *B. indica*; D = *B. maydis*; E = *B. papendorffii*; F = *B. setariae*; G = *C. affinis*; H = *C. cymbopogonis*; I = *C. fallax*; J = *C. lunata*; K = *E. inaequale*; L = *E. longirostratum*; M = *E. rostratum*; N = *E. turcicum*.



Table 11: Group separation table of DT analysis using the variables medium, day, temperature, roundness, ferret diameter and compactness.

	Total	A	B	C	D	E	F	G	H	I	J	K	L	N
A	40	35							1	1	2	1		
B	16	1	8			6					1			
C	36			29	1	3			1			1	1	
D	24			4	14	1	1		1			2	1	
E	27					26						1		
F	14				6		2						2	4
G	29	1						11		8	9			
H	39	10			7				15			7		
I	43							2		16	25			
J	45		2	1	1						40	1		
K	40	9				6	1	2	2		11	9		
L	44	2		1	7				2				29	3
M	29				8		1						18	2
N	22				3								5	14

A = *B. cynodontis*; **B** = *B. ellisii*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorffii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopogonis*; **I** = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*.

Figure 3: Line drawings of *B. cynodontis* PPRI 6535 spores formed under different cultural conditions. Scale bar = 10 μ m; average elongation E=3.41

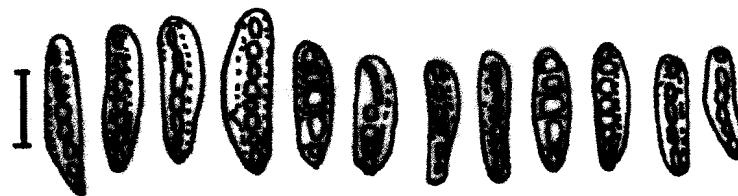


Ceres day 10; E=2.74



PCA day 5; E=3.58

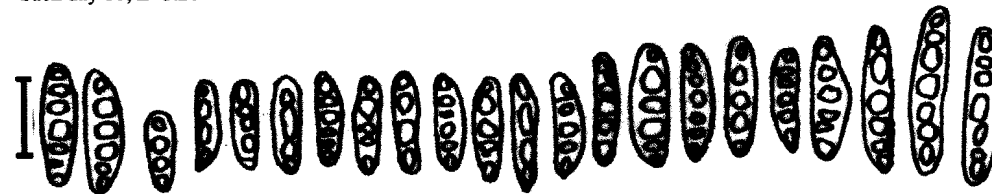
Glucose day 10; E=3.97



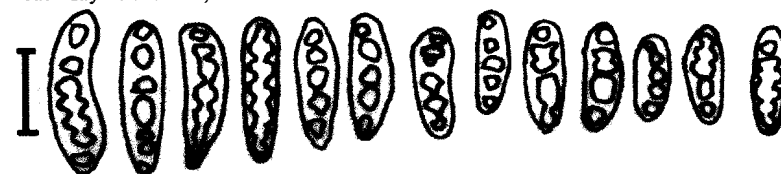
PCA day 10; E=3.63



Sach day 10; E=3.26



Sach day 10 at 30 °C; E=2.96



Sorbitol day 10; E=3.75

Figure 4: Line drawings of *B. ellisii* PPRI spores formed under different cultural conditions. Scale bar = 10 μ m; average E=2.17



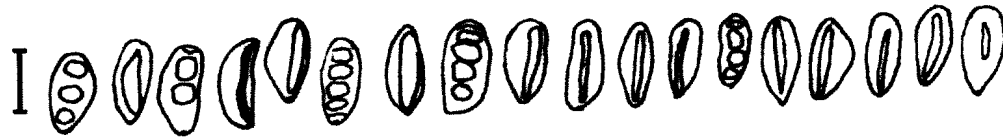
Ceres day 5; E=1.99



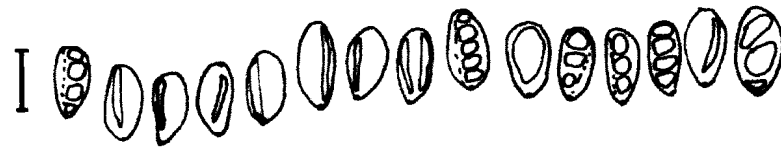
Ceres day 10; E=2.07



PCA day 5; E=2.13



PCA day 10; E=2.28



Sach day 5; E=2.10

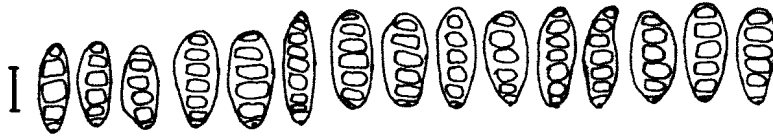


Sach day 8 at 30°C; E=2.29



WA day 10; E=2.25

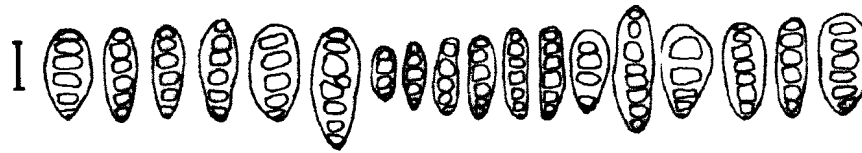
Figure 5: Line drawings of *B. indica* PPRI 6567 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=2.66



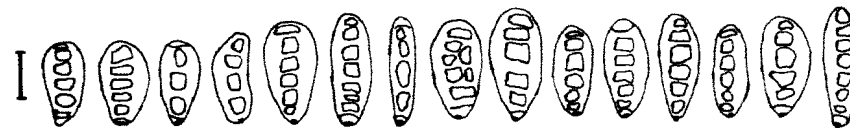
Ceres day 5; E=2.69



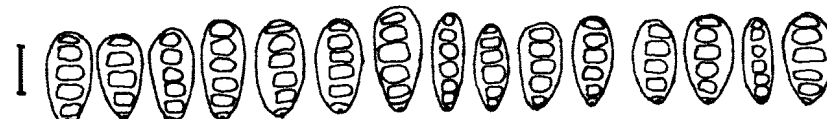
Ceres day 10; E=2.11



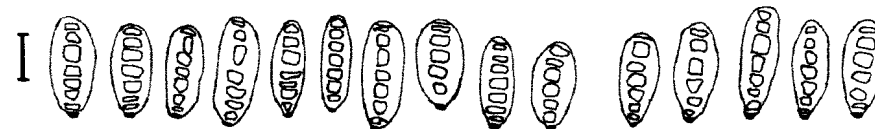
Sach day 5; E=2.43



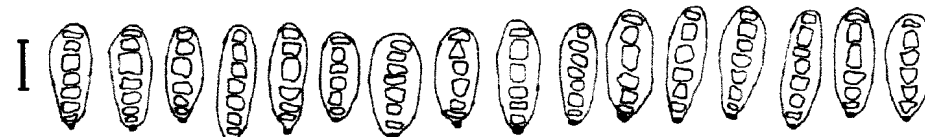
Sach day 8 at 30 °C; E=2.59



WA day 5; E=2.30

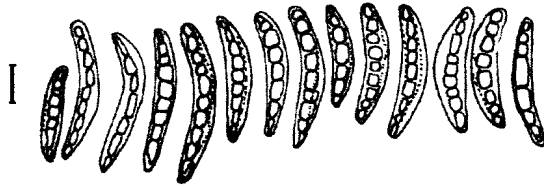


Sorbitol day 10; E=3.64



Glucose day 10; E=3.40

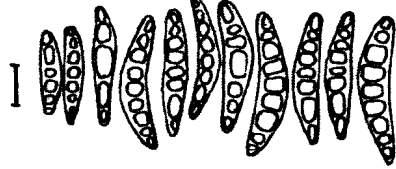
Figure 6: Line drawings of *B. maydis* PPRI 6564 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=4.76



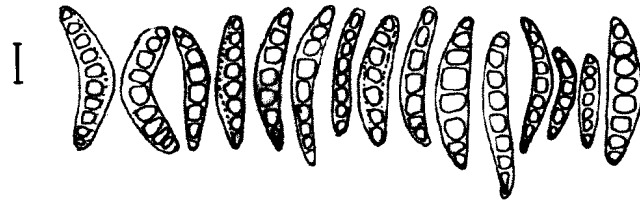
PCA day 10; E=5.54



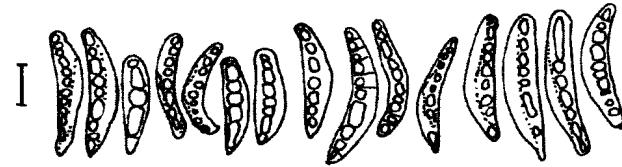
Ceres day 10; E=2.86



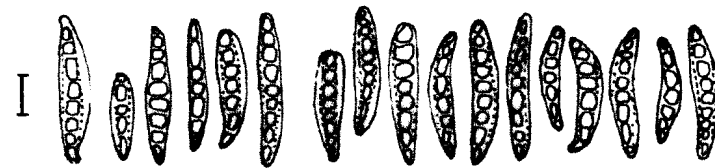
Sach day 8 at 30 °C; E=4.84



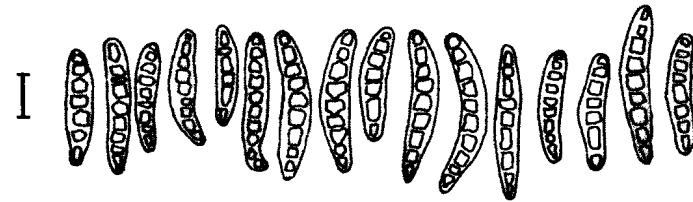
Sach day 10; E=4.69



WA day 10; E=5.11

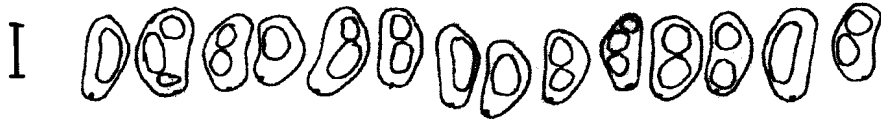


Sorbitol day 10; E=5.15



Glucose day 10; E=5.15

Figure 7: Line drawings of *B. papendorffii* PPRI 5855 and PPRI 6539 spores formed under different cultural conditions. Scale bar = 10 μ m; average $E=2.01$



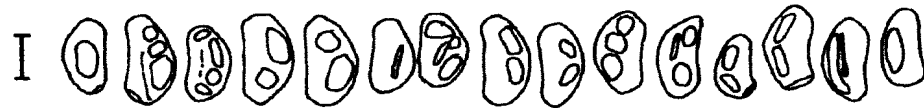
Ceres day 5; $E=1.94$



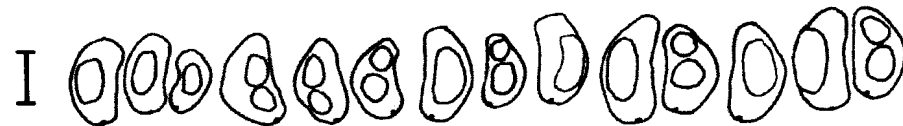
Ceres day 10; $E=1.83$



PCA day 5; $E=1.96$



PCA day 10; $E=1.85$



Sach day 5; $E=1.81$



Sach day 8 at 30°C; $E=2.13$

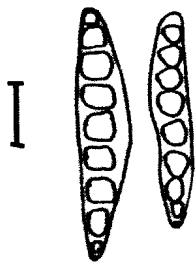


Sorbitol day 10; $E=2.26$



Glucose day 10; $E=2.37$

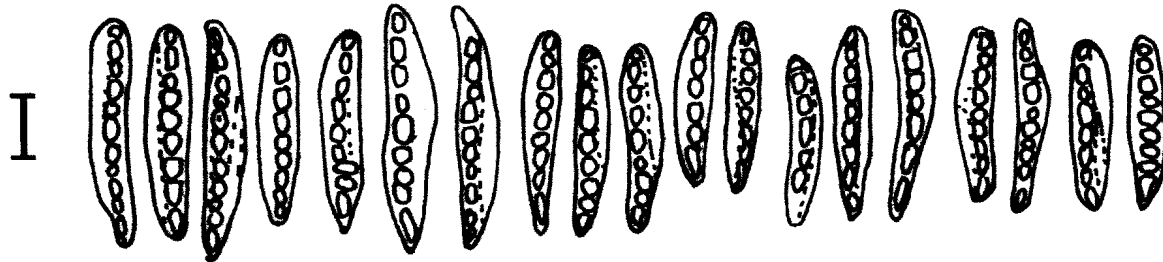
Figure 8: Line drawings of *B. setariae* PPRI 6633 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=5.22



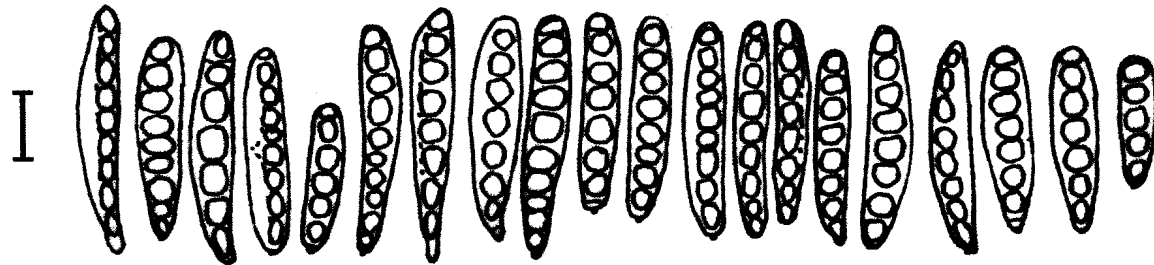
Ceres day 5; E= 5.24



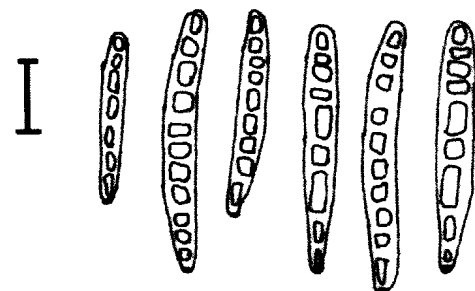
Ceres day 10; E= 5.20



PCA day 10; E= 5.19



WA day 10; E= 5.12

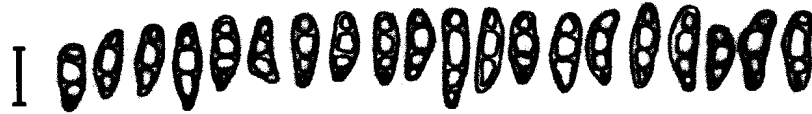


Glucose day 10; E= 5.37

Figure 9: Line drawings of *C. affinis* PPRI 6428 spores formed under different cultural conditions. Scale bar = 10 μ m; average 2.64



Ceres day 5; E=2.49



PCA day 5; E=2.91



PCA day 10; E=2.58



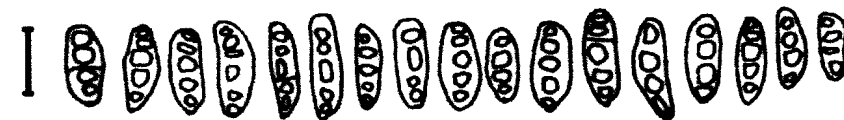
Sach day 5; E=2.5



Sach day 7 at 30 °C; E=2.79



WA day 10; E=2.45



Sorbitol day 10; E=2.77



Glucose day 10; E=2.70

Figure 10: Line drawings of *C. cymbopogonis* PPRI 6633 and PPRI 6592 spores formed under different cultural conditions. Scale bar = 10 μ m; average $E=3.6$



Ceres day 5; $E=3.04$



PCA day 5; $E=3.38$



PCA day 10; $E=2.87$



Sach day 5; $E=3.37$



Sach day 10; $E=3.61$



WA day 5; $E=2.68$



Sorbitol day 10; $E=3.00$

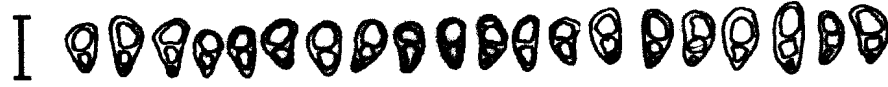


Glucose day 10; $E=3.79$

Figure 11: Line drawings of *C. fallax* PPRI 6445 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=2.38



Ceres day 5; E=1.95



Ceres day 10; E=2.26



PCA day 5; E=2.65



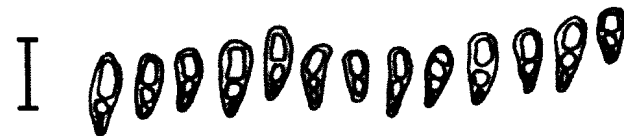
PCA day 10; E=2.5



Sach day 5; E=2.65



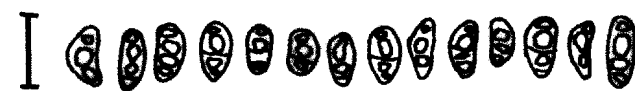
Sach day 10; E=2.67



WA day 10; E=2.08



Sorbitol day 10; E=2.24

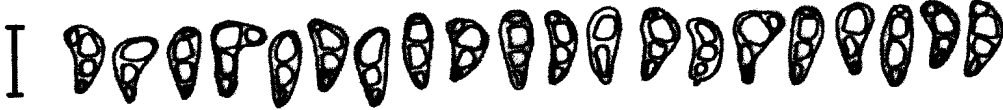


Glucose day 10; E=2.79

Figure 12: Line drawings of *C. lunata* PPRI 6540 and PPRI 6699 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=2.44



Ceres day 5; E=2.53



Ceres day 10; E=2.16



Sach day 5; E=3.53

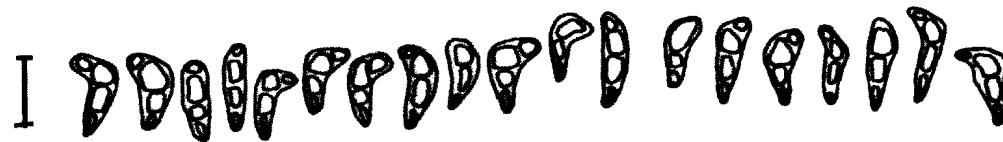


Sach day 10; E=2.76
E=1.95

Sach day 7 at 30°C;



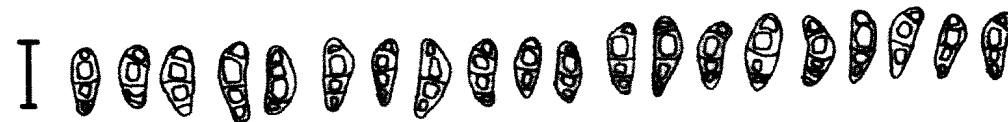
WA day 5; E=2.98



WA day 10; E=2.1



Sorbitol day 10; E=2.05



Glucose day 10; E=2.11

Figure 13: Line drawings of *E. inaequale* PPRI 6527 spores formed under different cultural conditions. Scale bar = 10 μ m; average $E=2.98$



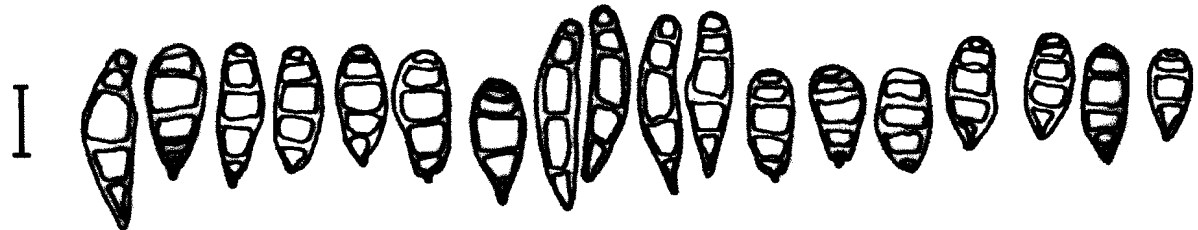
Ceres day 5; $E=2.09$



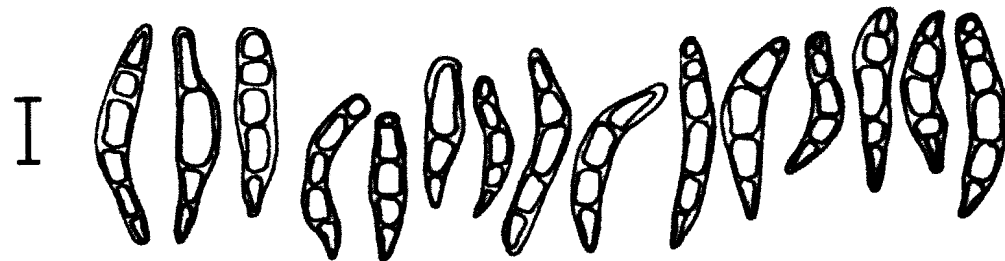
Ceres day 10; $E=2.05$



PCA day 5; $E=2.45$



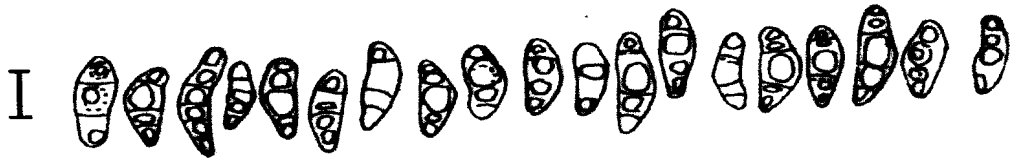
PCA day 10; $E=2.85$



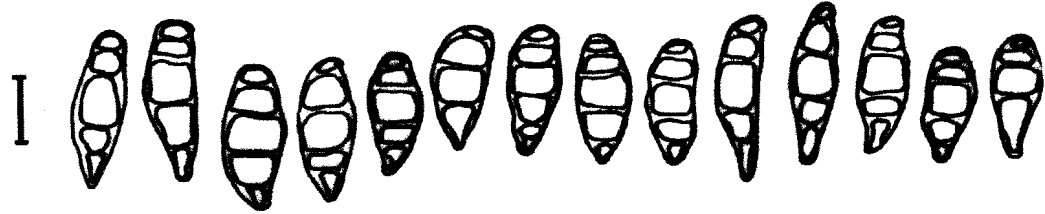
Sach day 5; $E=5.18$



Sach day 10; $E=4.29$



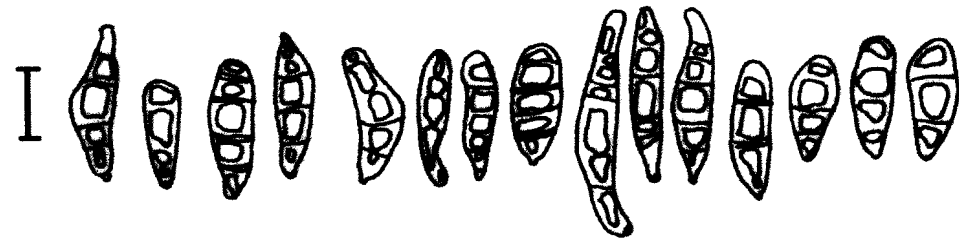
Sach day 7 at 30°C; E=3.14



WA day 5; E=2.29



WA day 10; E=3.5



Sorbitol day 10; E=2.71



Glucose day 10; E=2.24



Figure 14: Line drawings of *E. longirostratum* PPRI 6529 spores formed under different cultural conditions. Scale bar = 10 μ m; average E=7.82

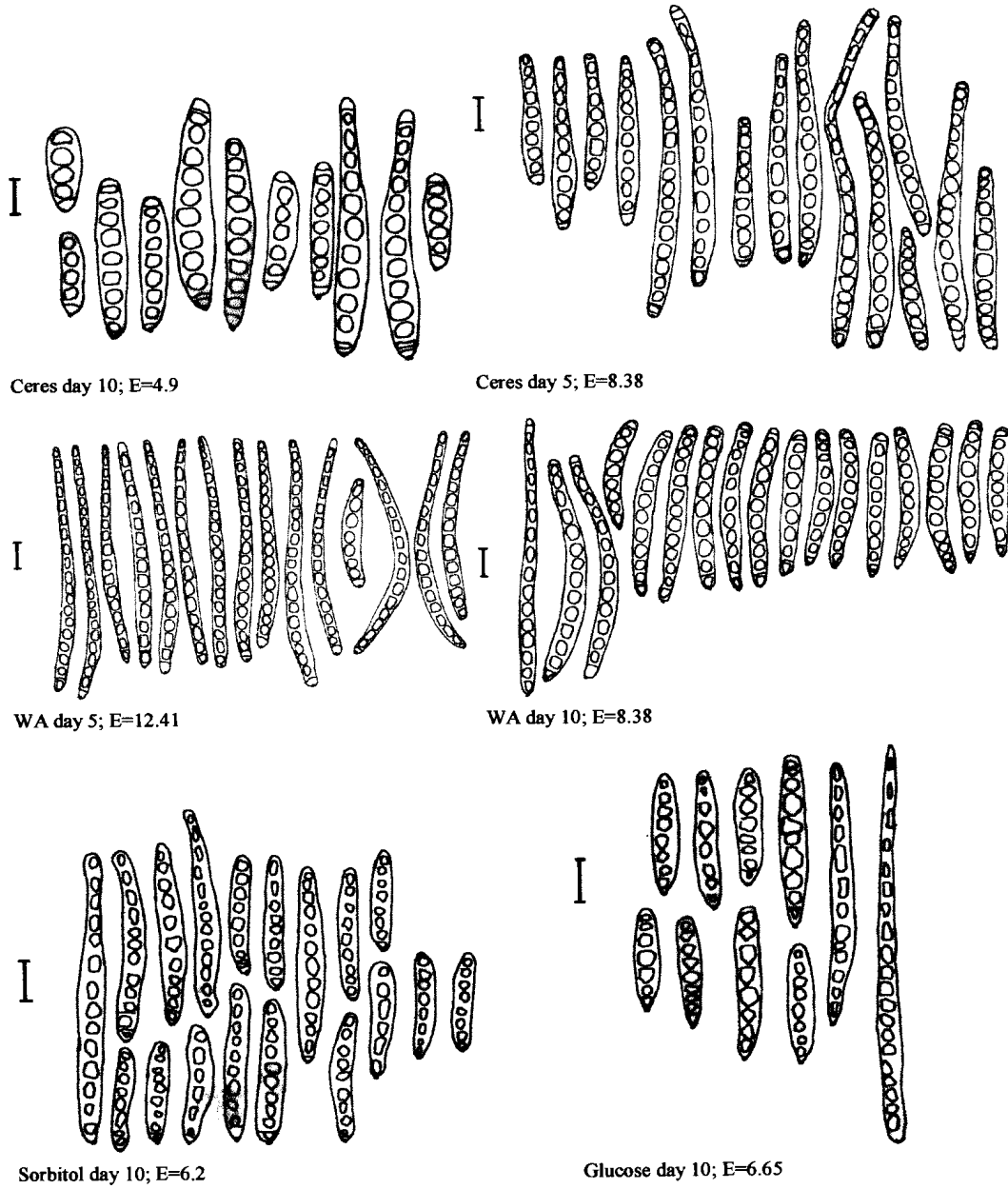


Figure 15: Line drawings of *E. rostratum* PPRI 6530 spores formed under different cultural conditions. Scale bar = 10 μ m; average $E=7.95$.

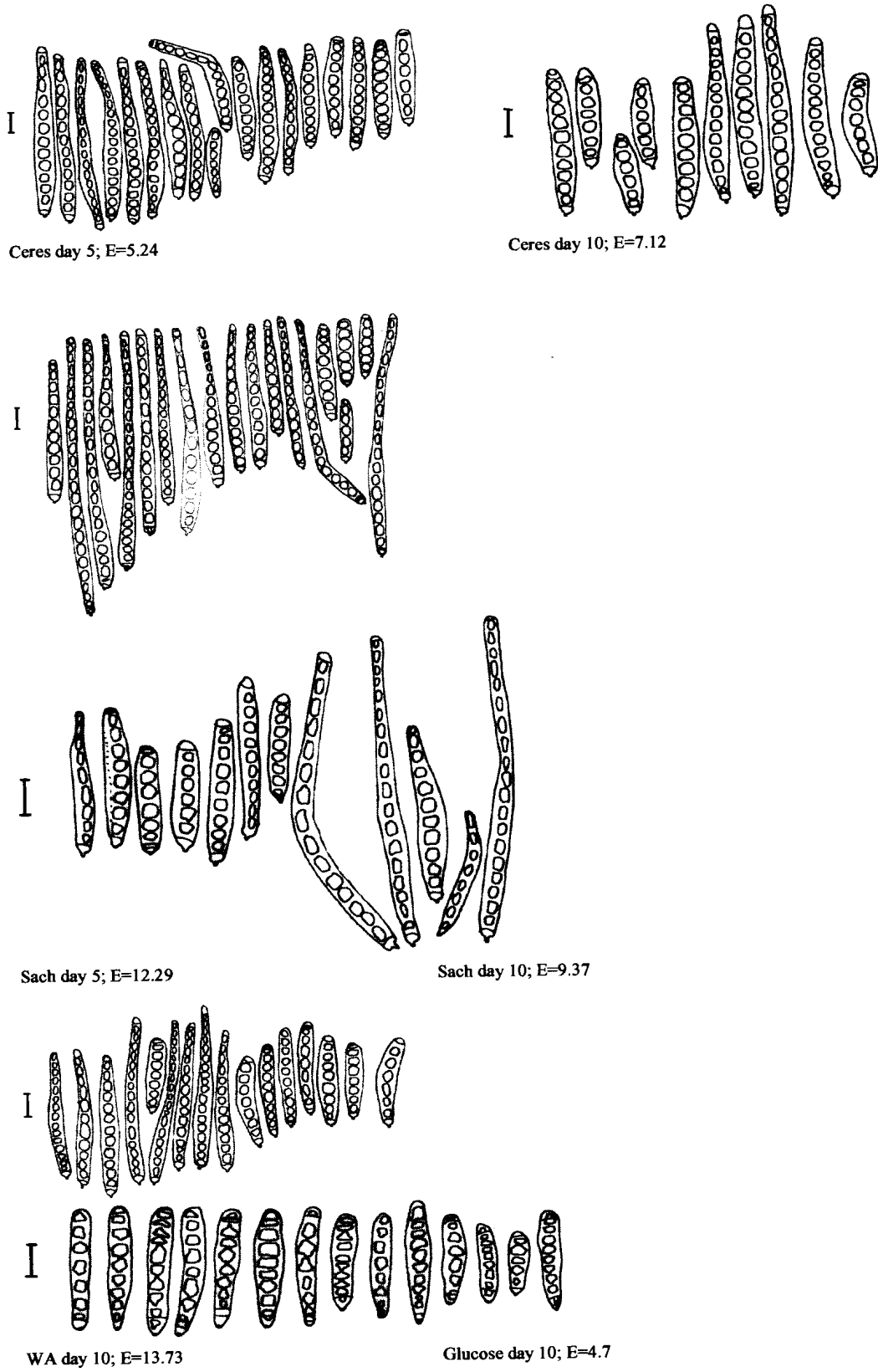
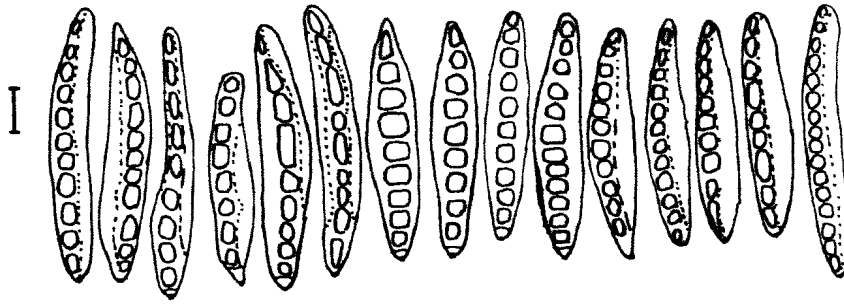
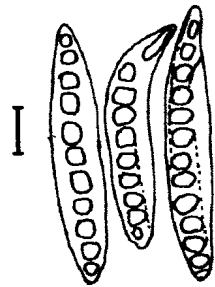


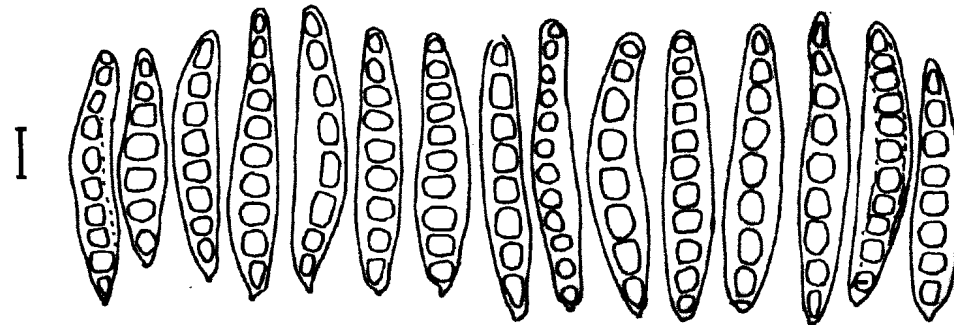
Figure 16: Line drawings of *E. turcicum* PPRI 6606 spores formed under different cultural conditions. Scale bar = 10 μ m. average E=5.44



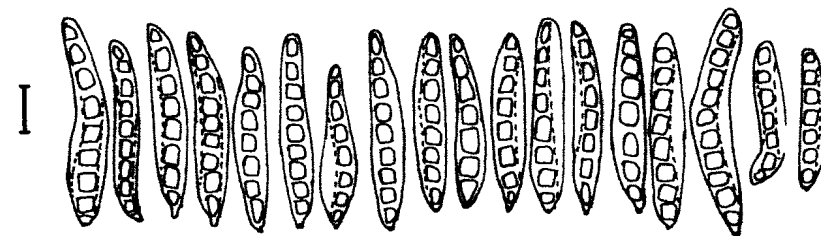
Ceres day 5; E= 5.51



Sach day 5; E= 5.50



Ceres day 10; E= 5.08



PCA day 10; E= 5.69



Appendix G: RESULTS OF CULTURE-BASED TESTS

Table 12: Group separation table using DT and culture-based tests 5, 7, 10, 15, 18, 21 and 25.

	Total	A	C	D	F	G	J	K	L	M	N	Accuracy
A	4	4										100%
B	2	2										0%
C	3		3									100%
D	6			4	1							66,6%
E	6			1			2	2			1	0%
F	3				3							100%
G	5	1		1		2					1	40%
H	5							1			4	0%
I	4					1	2	1				0%
J	7				1		4		1		1	57,1%
K	6							5			1	83,3%
L	5				1				4			80%
M	5									4	1	80%
N	6										6	100%

Total accuracy: 44/65 = 67,7%

A = *B. cynodontis*; **B** = *B. ellisii*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorfii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopogonis*; **I** = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*.



Table 13: Group separation table using FOIL and culture-based tests 5, 7, 10, 15, 18, 21 and 25.

	Total	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Accuracy
A	4	4														100%
B	2	1	1													50%
C	3			3												100%
D	6				4							1			1	66,7%
E	6					6										100%
F	3						3									100%
G	5		1					3							1	60%
H	5					1			4							80%
I	4									3	1					75%
J	7		1			1					5					71,4%
K	6					1						5				83,3%
L	5								1				4			80%
M	5					1								4		80%
N	6	1							1						4	66,7%

Total accuracy: 54/65 = 83%

A = *B. cynodontis*; **B** = *B. ellisii*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorfii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopogonis*; **I** = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*.



Table 14: Rules training set of FOIL for culture based test results.

IF a04Day5Min>61.5, a23Day6Min>63.5 THEN Organism=*E_rostratum*
IF a04Day6Max>79.0, a15Day7Min>70.0 THEN Organism=*E_longirostratum*
IF a18Day6Min<=43.0, a31Day1Max>3.75 THEN Organism=*B_indica*
IF a15Day5Max>63.5, a31Day1Max>3.75 THEN Organism=*B_setariae*
IF a23Day8Max<=61.5 THEN Organism=*E_turcicum*
IF a23Day9Min<=75.5 THEN Organism=*B_cynodontis*
IF a08Day9Min<=55.5 THEN Organism=*B_papendorfii*
IF a18Day9Min<=83.0 THEN Organism=*C_cymbopogonis*
IF a15Day10Min>72.5 THEN Organism=*B_papendorfii*
IF a18Day3Min<=19.5 THEN Organism=*E_turcicum*
IF a08Day9Min<=66.5, a31Day1Max>3.75 THEN Organism=*E_inaequale*
IF a15Day2Min>23.5, a31Day4Max<=43.5 THEN Organism=*C_lunata*
IF a15Day8Min>72.0, a23Day4Max>39.5 THEN Organism=*C_affinis*
IF a04Day1Min>0.37, a31Day1Max<=7.25 THEN Organism=*B_maydis*
IF a15Day5Max<=42.5 THEN Organism=*E_inaequale*
IF a23Day1Min<=8.75 THEN Organism=*B_cynodontis*
IF a15Day3Min>32.5 THEN Organism=*C_fallax*
IF a23Day2Max<=19.5 THEN Organism=*C_lunata*
IF a13Day3Min>11.5 THEN Organism=*C_cymbopogonis*
IF a31Day5Max>45.0, a31Day2Max>15.5 THEN Organism=*B_papendorfii*
IF a31Day1Max>3.75 THEN Organism=*B_ellisii*
IF THEN Organism=*B_maydis*

Appendix H: SEQUENCING AND ISSR RESULTS

Figure 17: Homology tree derived from 28S rRNA encoding gene sequences.

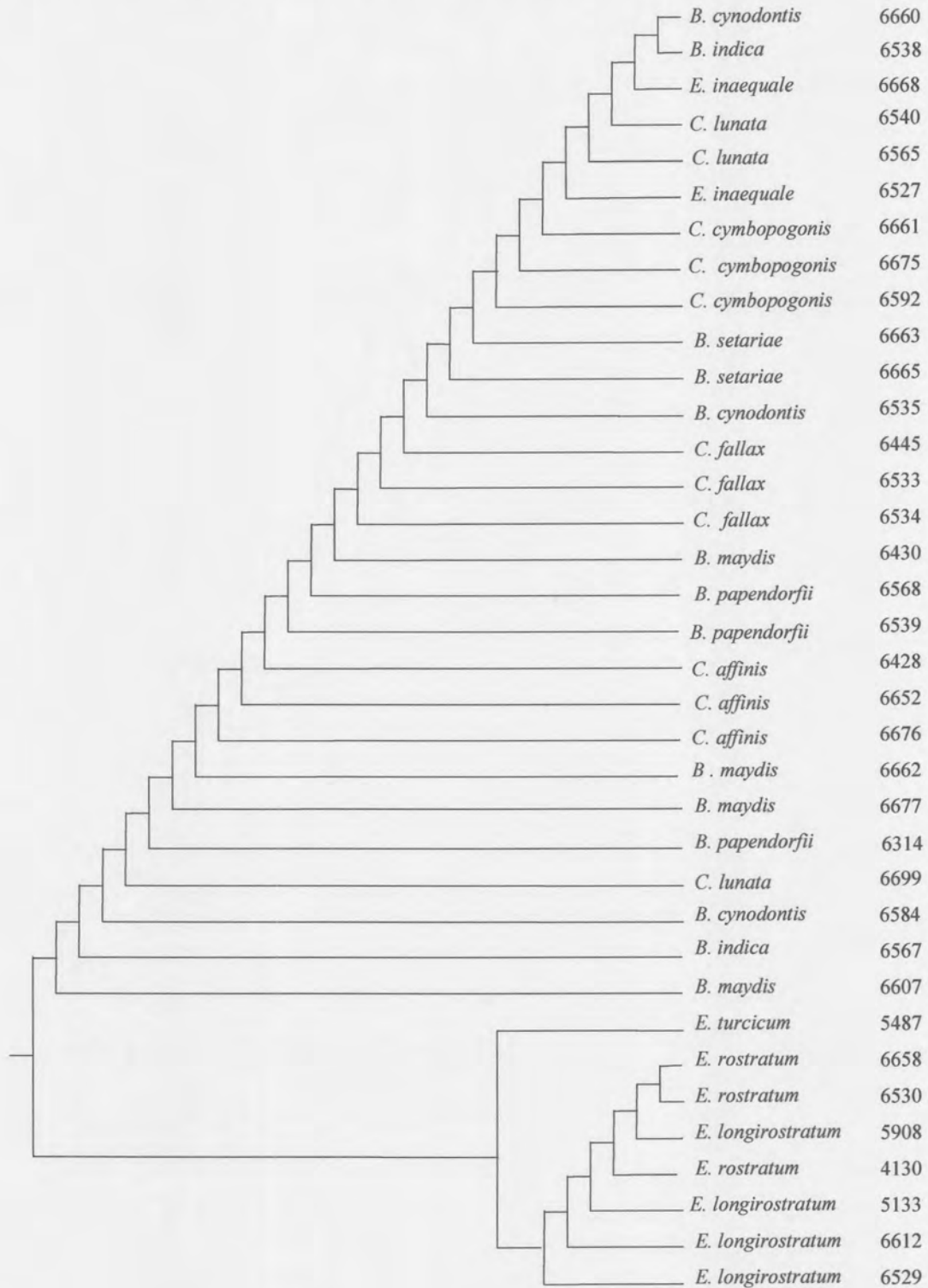
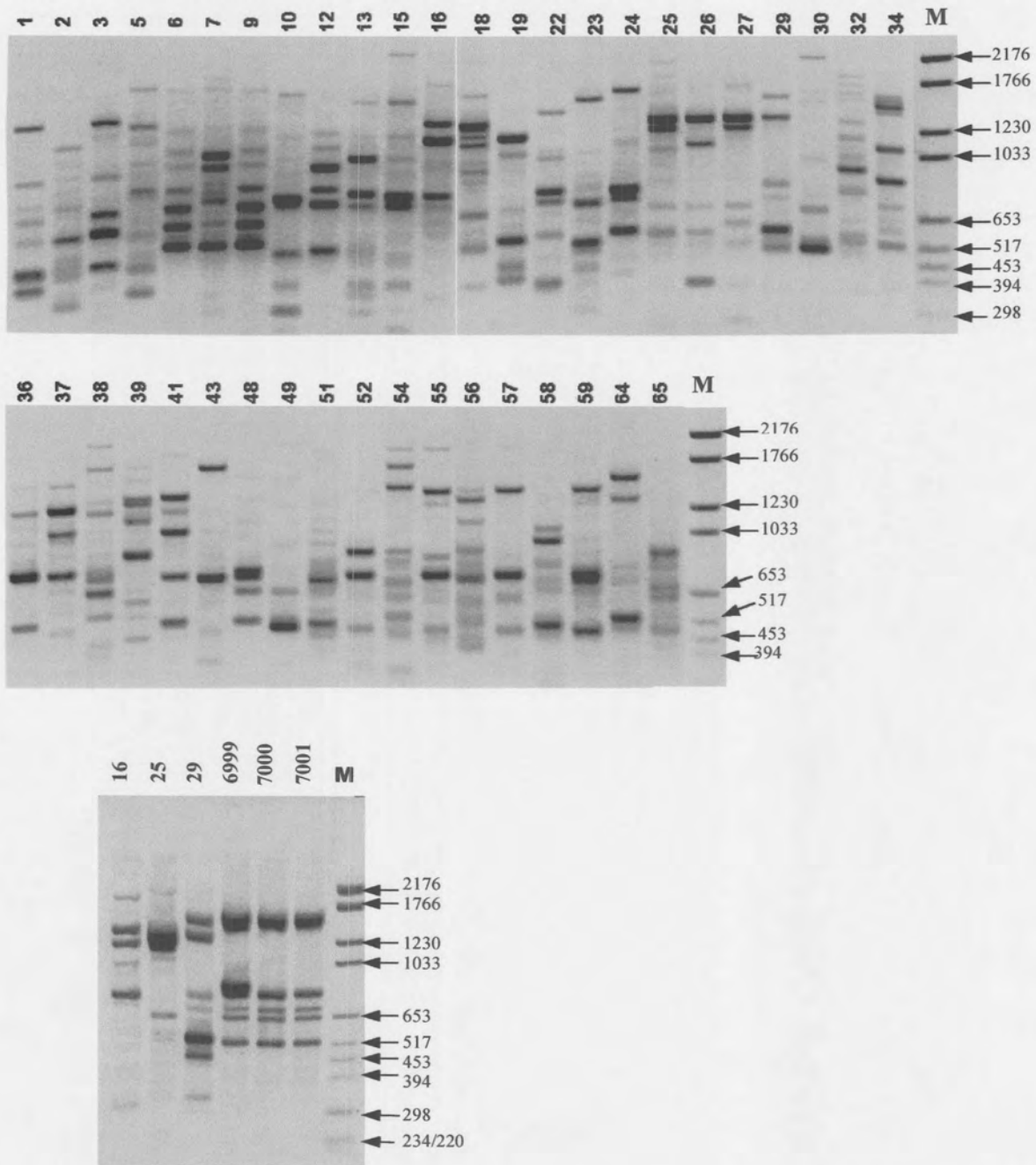
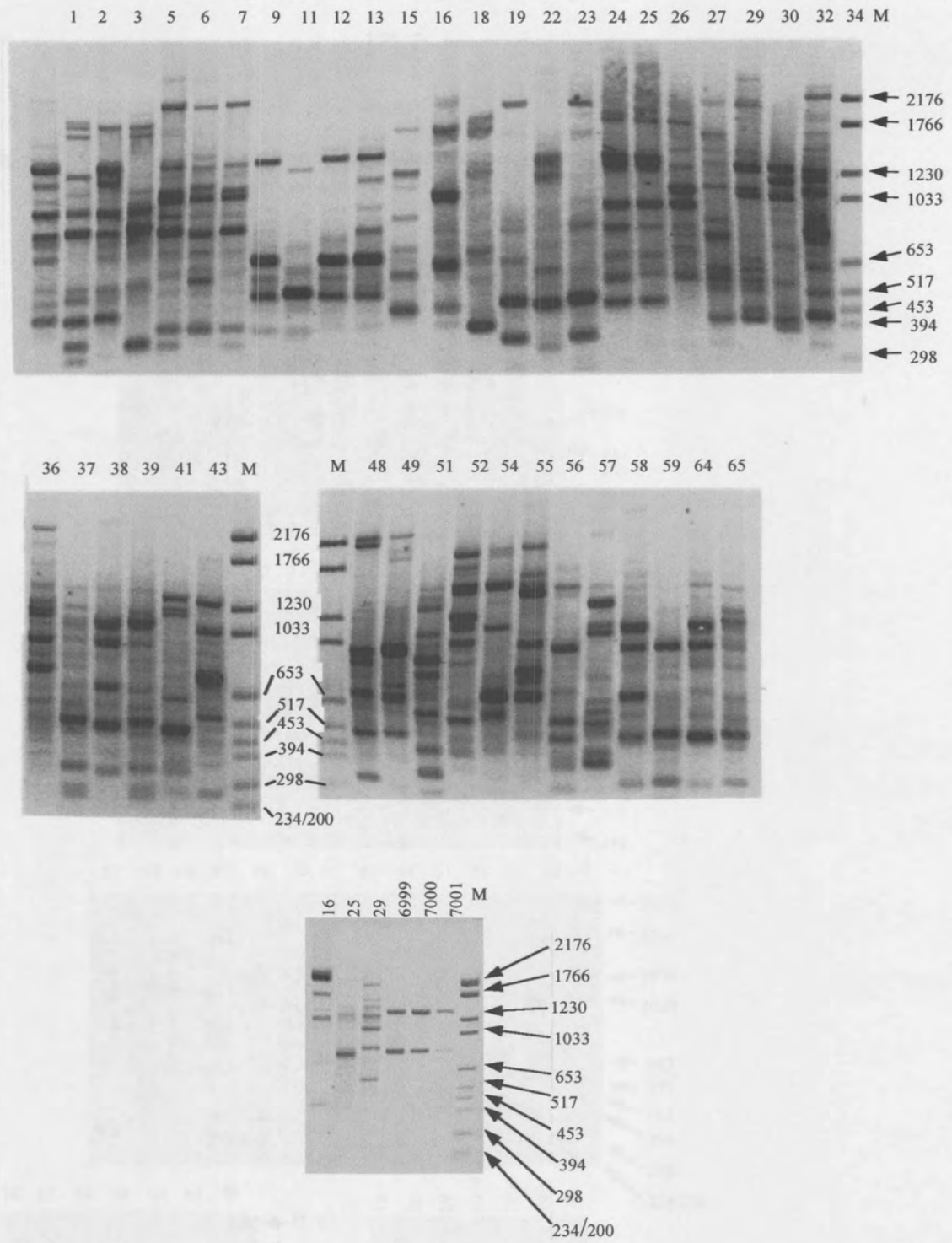


Figure 18: Agarose gel image of ISSR bands using the primer DBD-(AC)₇.



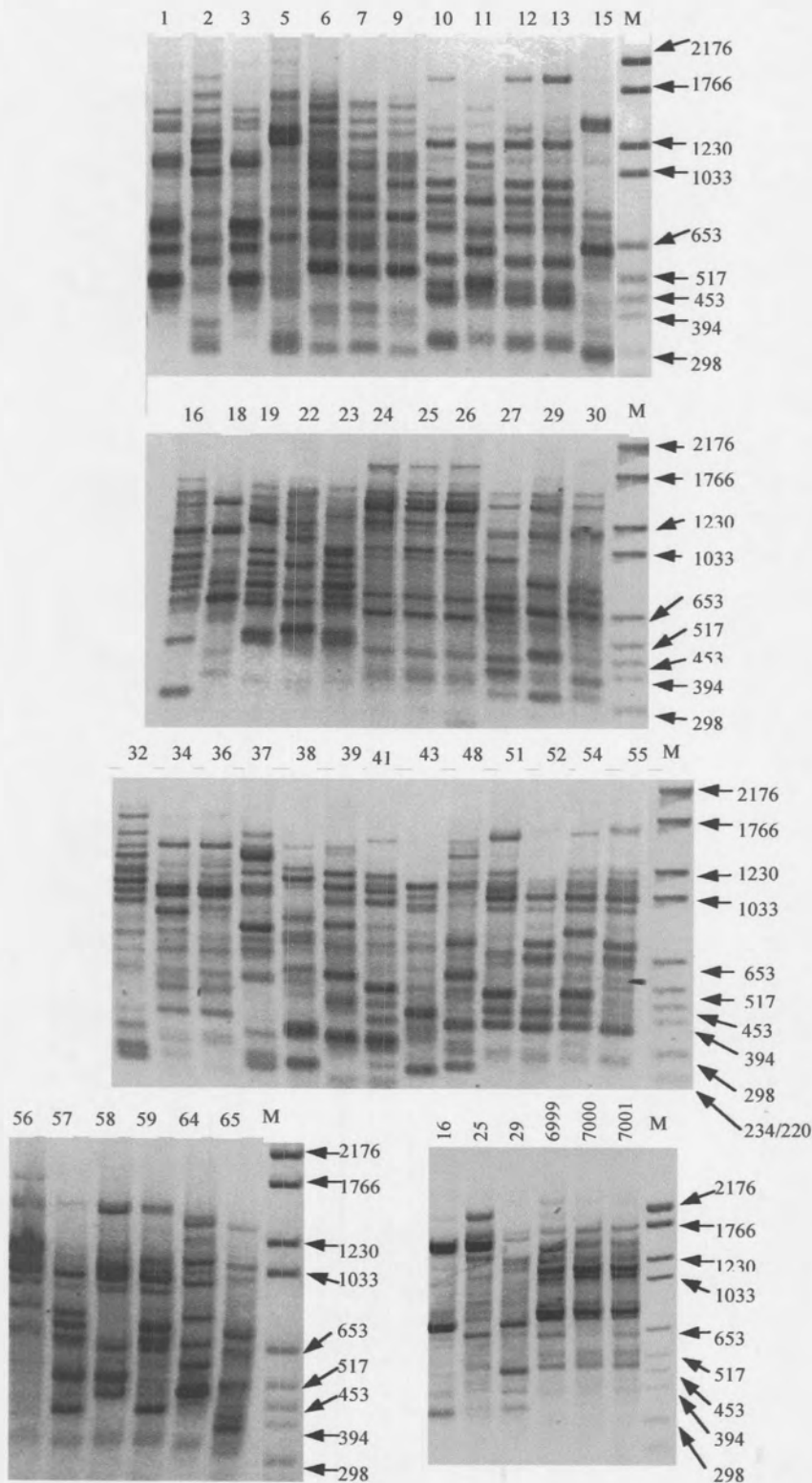
M=Molecular weight marker in base pairs

Figure 19: Agarose gel image of ISSR bands using the primer BDB-(CAC)₅.



M=Molecular weight marker in base pairs

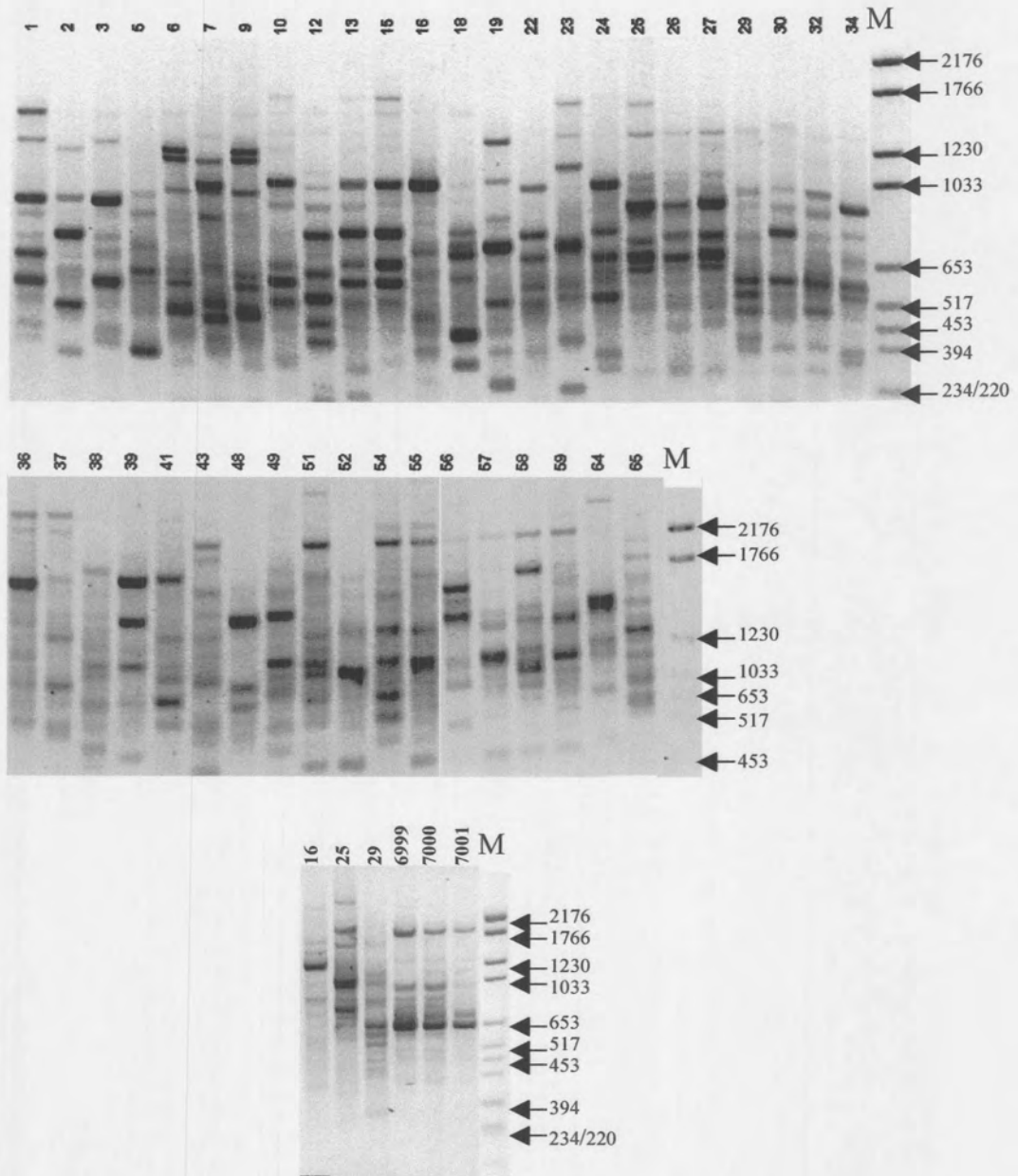
Figure 20: Agarose gel image of ISSR bands using the primer DHB- (CGA)₅



M=Molecular weight marker in base pairs



Figure 21: Agarose gel image of ISSR bands using the primer VHV-(GT)₇G.



M=Molecular weight marker in base pairs

Figure 22: Dendrogram using the DICE coefficient illustrating similarity between selected *Bipolaris*-like strains using ISSR fingerprints obtained with the primer BDB-(CAC)₅.

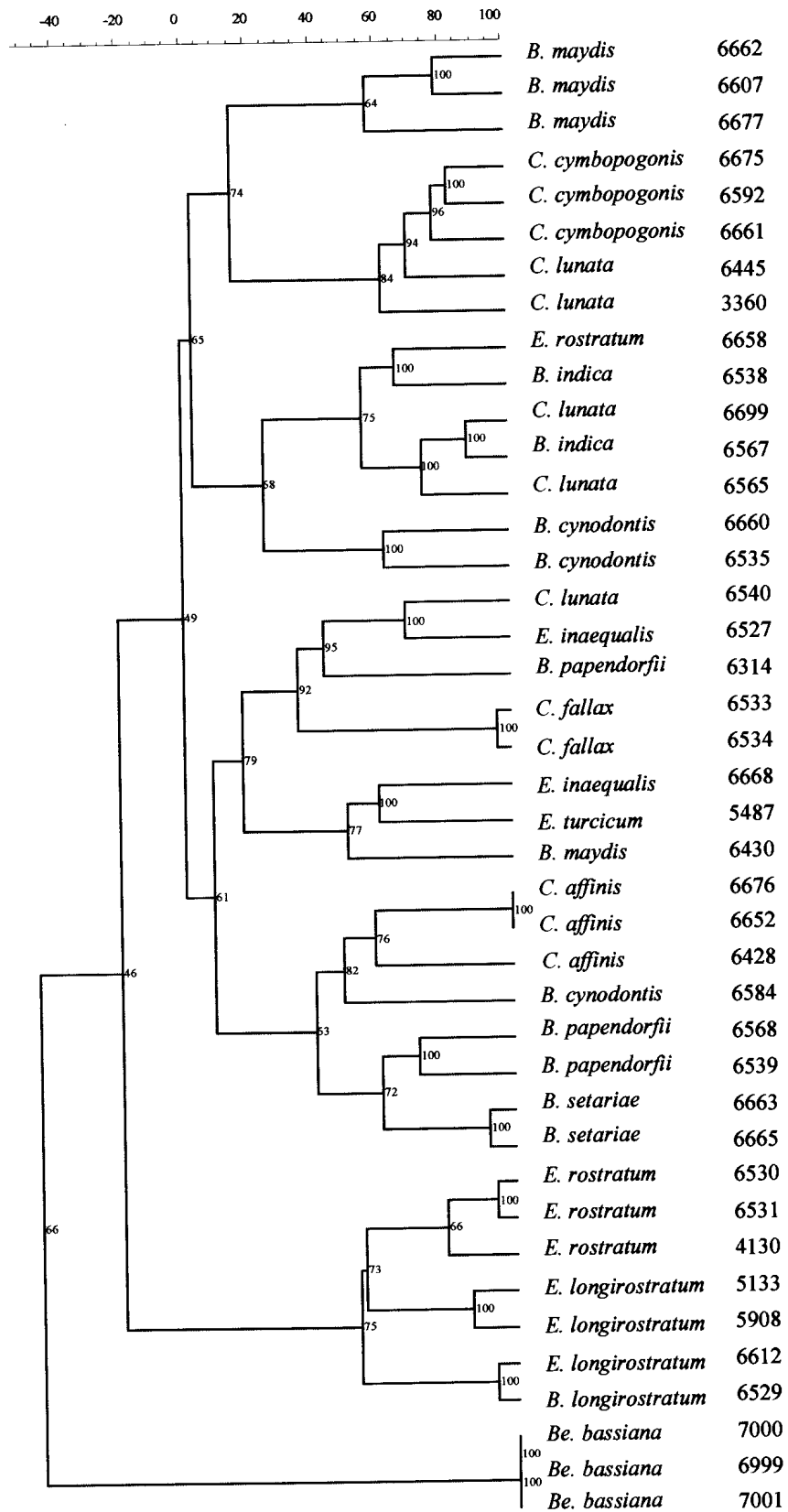


Figure 24: Dendrogram illustrating similarity between *Bipolaris*-like strains using ISSR fingerprints of all four primers calculated with Pearson's correlation coefficient

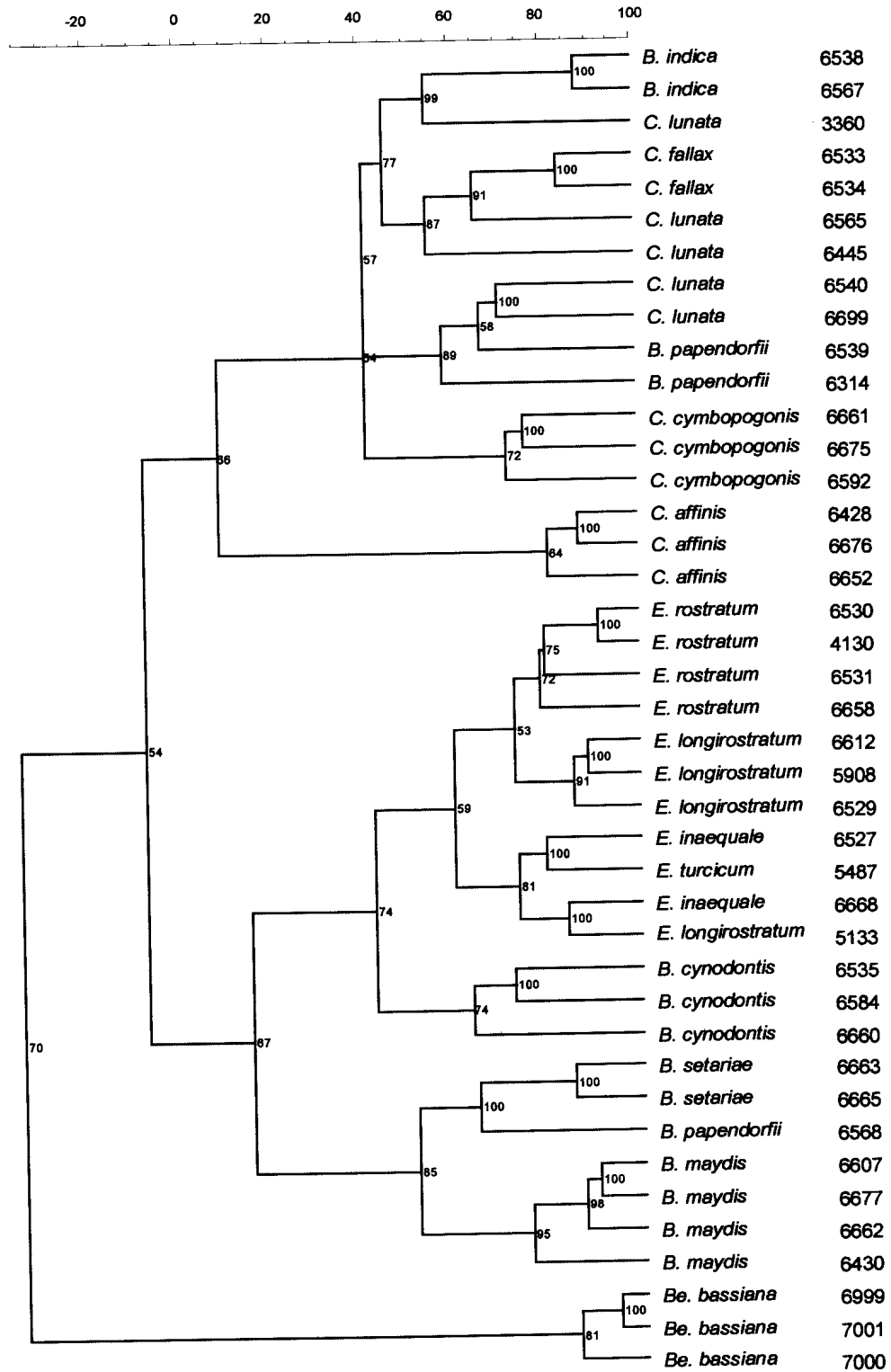


Figure 25: Dendrogram illustrating similarity between *Bipolaris*-like strains using ISSR fingerprints of all four primers calculated with the Dice coefficient.

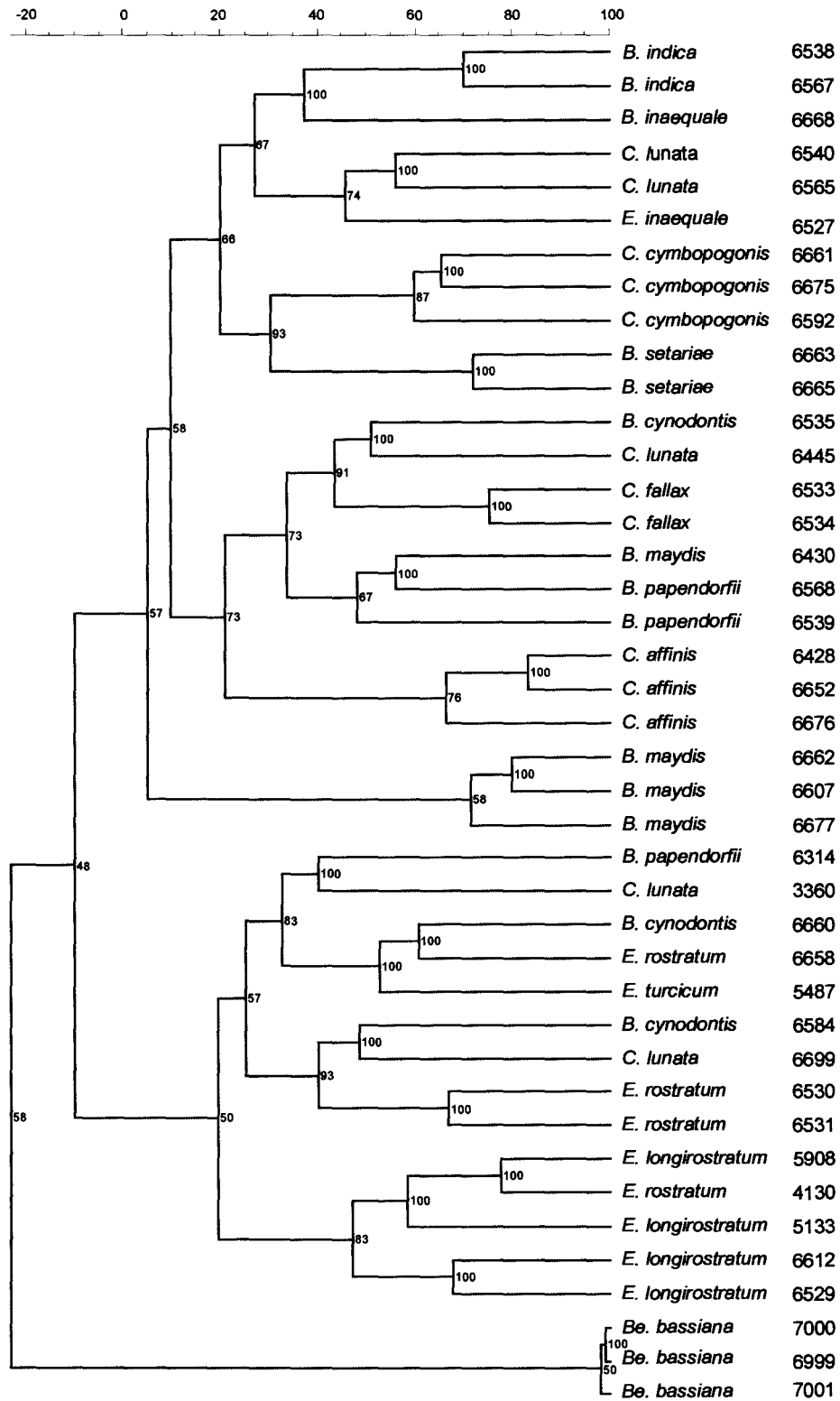


Table 15: Group separation table of average similarity using banding patterns of all ISSR, Dice similarity coefficient and Ward clustering (Empty cells = 0).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	100.00													
B									33.33				33.33	33.33
C			100.00											
D			25.00	50.00	25.00				25.00					
E	33.33	33.33	33.33											
F						50.00								50.00
G			33.33			33.33	33.33							
H			100.00											
I									100.00					
J	20.00	20.00	20.00		20.00						20.00			
K									50.00		50.00			
L		25.00					25.00		50.00					
M		25.00										50.00		25.00
N														100.00

A = *Be. bassiana*; **B** = *B. cynodontis*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorffii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopoginis*;

I = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*.

Table 16: Group separation table of maximum similarity using banding patterns of all ISSR, Dice similarity coefficient and Ward clustering (Empty cells = 0).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	100.00													
B					33.33								33.33	33.33
C			100.00											
D			25.00	75.00										
E			33.33						33.33				33.33	
F						50.00								50.00
G							33.33					33.33	33.33	
H			33.33							33.33		33.33		
I									50.00			50.00		
J			20.00					20.00		20.00		40.00		
K										50.00			50.00	
L		25.00							25.00				50.00	
M		75.00										25.00		
N		100.00												

A = *Be. bassiana*; B = *B. cynodontis*; C = *B. indica*; D = *B. maydis*; E = *B. papendorffii*; F = *B. setariae*; G = *C. affinis*; H = *C. cymbopoginis*; I = *C. fallax*; J = *C. lunata*; K = *E. inaequale*; L = *E. longirostratum*; M = *E. rostratum*; N = *E. turcicum*

Table 17: Group separation table of average similarity using banding patterns of all ISSR, Pearson correlation coefficient and Ward clustering (Empty cells = 0).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	100.00													
B											33.33		33.33	33.33
C			100.00											
D			25.00	75.00										
E		33.33			33.33		33.33							
F						100.00								
G							100.00							
H			100.00											
I									50.00				50.00	
J	20.00				20.00				20.00			20.00		20.00
K														100.00
L													25.00	75.00
M												25.00	25.00	50.00
N														100.00

A = *Be. bassiana*; **B** = *B. cynodontis*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorfii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopoginis*;

I = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*

Table 18: Group separation table of maximum similarity using banding patterns of all ISSR, Pearson correlation coefficient and Ward clustering (Empty cells = 0).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	100.00													
B													66.67	33.33
C			100.00											
D			25.00	75.00										
E		33.33			66.67									
F				50.00		50.00								
G							100.00							
H			100.00											
I										50.00		50.00		
J	20.00			20.00					20.00	20.00	20.00			
K												100.00		
L											25.00		50.00	25.00
M												75.00	25.00	
N												100.00		

A = *Be. bassiana*; **B** = *B. cynodontis*; **C** = *B. indica*; **D** = *B. maydis*; **E** = *B. papendorfii*; **F** = *B. setariae*; **G** = *C. affinis*; **H** = *C. cymbopoginis*;

I = *C. fallax*; **J** = *C. lunata*; **K** = *E. inaequale*; **L** = *E. longirostratum*; **M** = *E. rostratum*; **N** = *E. turcicum*