

Recent Investigations into the Toxicity of Known and Unknown Poisonous Plants in the Union of South Africa, X.

By S. J. VAN DER WALT and DOUW G. STEYN, Section
of Pharmacology and Toxicology, Onderstepoort.

(Continued from *Onderstepoort Journal of Veterinary
Science and Animal Industry*, Vol. 12, No. 2.)

ASCLEPIADACEAE.

Cryptolepis decidua N.E.Br.

(Figure 1.)

Registered No.: 156A; 31/3/39.

Common Name: —

Origin: Friedabrunn, Mariental, South West Africa.

State and Stage of Development: The plant was fairly wilted and in
the late flowering and early seeding stages.

Sheep 52875 (4-tooth; 41.0 Kg.) was given* 500 gm. of the wilted
plant at 3.45 p.m. on 5.4.39.

6.4.39; 8.30 a.m.: Apathy; pronounced laboured
respiration (costo-abdominal); pulse fairly slow and strong;
conjunctivae very red; ruminal movements in abeyance;
anorexia; very pronounced diarrhoea.

6.4.39: 12 noon: The sheep was given another 250 gms.
of the almost dry plant.

6.4.39: 2 p.m.: Very apathetic; breathing with the
mouth open, expiration being very laboured; pulse extremely
rapid, irregular and almost imperceptible; slight tympanites;
clonic convulsions of the body muscles; general weakness;
unable to support itself when lifted; marked cyanosis.

The sheep died at 3.30 p.m. the head being pulled back with
the limbs extended and showing clonic convulsions.

* All animals are dosed by means of a stomach tube.



Fig. 1.—*Cryptolepis decidua* N.E.Br.

Post-mortem Appearances.—Pronounced general cyanosis; slight tympanites of the rumen; pronounced hyperaemia with slight atelectasis of the lungs; congestion of the liver and kidneys; few hyperaemic areas in the ruminal wall; slight hyperaemia of the abomasum; slight acute catarrhal duodenitis.

Histology.—Congestion of the kidneys, myocardium, spleen and liver. Fatty changes were noted in the latter organ.

CACTACEAE.

Opuntia sp.

Registered Number: O.P.H. No. 31730; 26.1.39.

Common Name: Prickly pear, turksvy.

Origin: Guchab, South West Africa.

State and Stage of Development: The plant was in the fresh state without flowers or fruit.

Using the method of Rimington and Steyn (1933) the fresh leaves were found to contain 11.7 per cent. oxalates calculated as oxalic acid on the dry weight basis. The moisture content equalled 91.85 per cent. The leaves were suspected of having caused poisoning in pigs.

COMPOSITAE.

Cryptostemma calendulaceum R.Br.

(Figure 2.)

Registered Number: O.P.H. No. 24396; 25.10.38.

Common Name: —

Origin: Grahamstown, Cape Province.

State and Stage of Development: The plant was in the dry state and in the flowering stage.

Rabbit A (1.95 Kg.) was given, at 11 a.m. on 2.11.38, the juice expressed from 50 gm. of the plant.

2.11.38: 3 p.m.: Paresis had set in, the animal, however, still struggling when handled. The respiration was rapid and shallow whilst the heart beat was imperceptible and the conjunctivae pale.

Within ten minutes the head slowly dropped to the floor of the cage. At first the animal was able to lift its head but was unable to keep it up with the result that it slowly dropped to the floor of the cage. However, within a few minutes complete paralysis had set in.

At this stage the corneal and pupillary reflexes were decreased and the animal was insensitive all over its body and extremities to pinpricks. Finally convulsions, probably asphyxia, accompanied by "crying" set in. The respiration was extremely laboured whilst

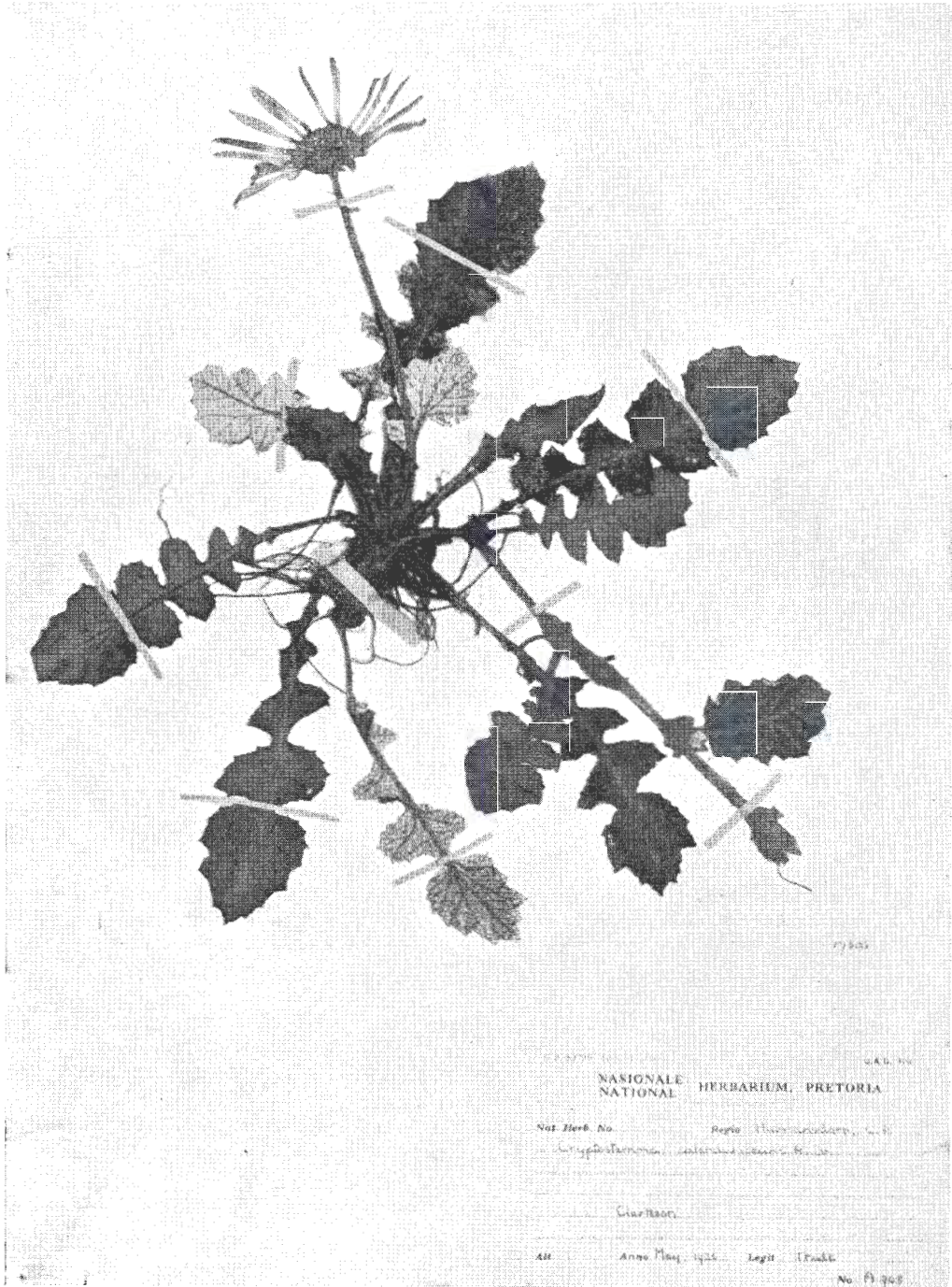


Fig. 2.—*Cryptostemma calendulaceum* R.Br.

undulations of the abdominal wall caused by intestinal peristalsis were observed. The pupils became widely dilated and the animal died at 3.30 p.m. on 2.11.38.

Post-mortem Appearance.—General cyanosis; slight hydroperitoneum; heart dilated; congestion and marked emphysema of both lungs; degeneration and congestion of the kidneys and liver; tympanites of the stomach with marked hyperaemia of the mucosa of the stomach and small intestine, the contents of the latter being haemorrhagic and containing cylinders of fibrin; hyperaemia of the mucous membrane of the urinary bladder.

Rabbit B (1.45 Kg.) was given the juice expressed from 55 gm. of the plant in two doses in the course of 24 hours on 2.11.38 and 3.11.38.

The animal died overnight on 3.11.38.

Post-mortem Appearances.—Abdomen very distended; general cyanosis; hydrothorax; heart dilated; emphysema of both lungs with an area of consolidation in the left lung (aspiration of material); pronounced tympanites of the stomach with hyperaemia and necrosis of the mucous membrane of the stomach; congestion of the liver and kidneys.

The narcotic action of the active principle(s) of the plant supports the claim of the sender that the juice expressed from the crushed or minced plant mixed with milk is an antidote for strychnine poisoning.

Gnaphalium luteoalbum Linn.

Registered Number: O.P.H. No. 24942A; 31.10.38.

Common Name: Cud weed, "roerkruid".

Origin: Lake Chrissie.

State and stage of development: The plant was fairly fresh and in the early flowering stage.

Sheep 51758 (6-tooth; 41.5 Kg.) was given 2.3 Kg. of the plant in the course of 30 hours.

Result: Negative.

Helichrysum cephaloideum D.C. var. *adscendens*.

(Figure 3.)

Registered number.—O.P.H. No. 24368, 24.10.38; and 24701-02, 27.10.38.

Common name:—

Origin: Bathurst, Cape Province.

State and stage of development: The plant was in the dry state and in the flowering stage.



Fig. 3.—*Helichrysum celphaloideum* D.C. var. *adscendens*.

Sheep 52109 (4-tooth; 39·0 Kg.) was given 600 gm. of the dry plant on 2.11.38.

3.11.38: Anorexia; apathy; diuresis; decreased activity of the rumen; accelerated pulse and respiration; diarrhoea.

4.11.38: As for the previous day except that the ruminal movements were in abeyance.

6.11.38-20.11.38: Diarrhoea had ceased and was followed by severe constipation.

21.11.38: The sheep died after subcutaneous administration of 0·5 c.c. Lentin.

Post-mortem appearances.—Fairly marked post-mortem changes; general cyanosis; hyperaemia and oedema of both lungs; stasis of ingesta throughout the alimentary tract; hyperaemia of the abomasum and small intestine; fat necrosis.

CUCURBITACEAE.

Kedrostis nana Cogn.

(Figure 4.)

Registered number: O.P.H. No. 34226, 14.3.39; and 2674, 16.6.39.

Common name:—

Origin: Cape Town, Cape Province.

State and stage of development: The plant was in the fresh state without flowers or fruit.

Sheep 51158 (4-tooth; 25·5 Kg.) was given 700 gm. of the dried plant (O.P.H. No. 2674; 16.6.39) in the course of 5 hours on 20.6.39.

21.6.39: The Animal had developed a slight diarrhoea.

22.6.39: Recovered.

Sheep 51364 (4-tooth; 20·5 Kg.) was given 2·4 Kg. of the fresh tubers in the course of 24 hours on 20.6.39 and 21.6.39.

21.6.39: The animal had developed a slight diarrhoea.

22.6.39: Recovered.

Rabbit A (1·4 Kg.) was given 120 c.c. of the juice expressed from the tubers of the first consignment of the plant (O.P.H. No. 34226; 14.3.39). Two hours after receiving the above dose the following symptoms were observed in the animal: Pupils dilated; heartbeat imperceptible; "crying"; convulsions; undulations of the abdominal wall caused by very active peristalsis of the intestines. The animal died 10 minutes later.

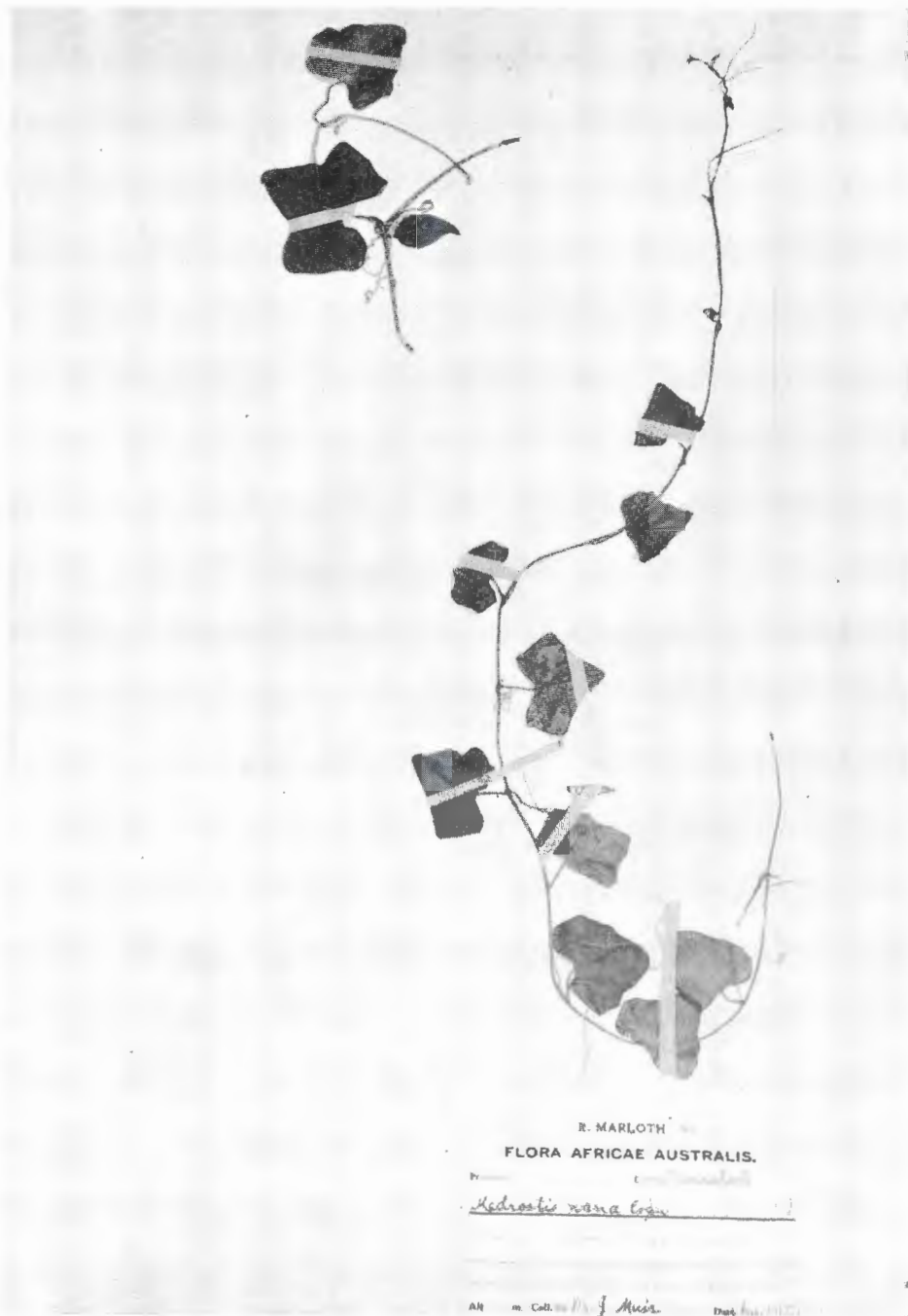


Fig. 4.—*Kedrostis nana* Cogn.

Post-mortem appearances: General cyanosis; congestion and slight emphysema of both lungs; congestion of, and regressive changes in, the liver and kidneys; severe hyperaemia of the mucosa of the stomach; fairly marked hyperaemia of the mucosa of the small intestine.

The following rabbits were drenched with the pulped tubers of the second consignment of the plant (O.P.H. No. 2674; 16.6.39).

Rabbit B (1.4 Kg.) was given 30 gm. of the fresh tubers.

Thirty minutes later the animal was lying down, the heart action was weak and the respiration very laboured. Death occurred five minutes later.

Post-mortem appearances: Marked emphysema and hyperaemia of both lungs with occasional haemorrhages; severe hyperaemia of, and several haemorrhagic areas in, the gastric mucosa; severe hyperaemia of the mucosa of the small intestine, the contents being haemorrhagic.

Rabbit C (1.8 Kg.) was given 15 gm. of the fresh tubers. The animal died overnight.

Post-mortem appearances.—As for Rabbit B, except that necrotic changes were observed in the gastric mucosa and that the region of the anus was soiled by diarrhoeic faeces.

Rabbit D (2.7 Kg.) was given 7.5 gm. of the fresh tubers

Symptoms.—Six hours after drenching, the rabbit was found paralysed with rapid superficial respiration, the heartbeat being imperceptible. A large quantity of fluid faeces had been passed. The rabbit died 15 minutes later

Post-mortem.—As for the previous rabbit.

Rabbit E (1.85 Kg.) was given 3.5 gm. of the fresh tubers on 26.6.39.

27.6.39: Anorexia.

28.6.39: Feeding and altogether normal.

EUPHORBIACEAE.

Croton megalobotrys Nüll.Arg.

Registered number: O.P.H. No. 33174; 22.2.39.

Common name:—

Origin: Dennilton, Pretoria.

State and stage of development: The plant was in the fresh state with maturing fruit.

Rabbit A (1.5 Kg.) was given the juice expressed from 255 gm. of the fruit in the course of 24 hours.

Result: Negative.

TOXICITY OF KNOWN AND UNKNOWN POISONOUS PLANTS.

Rabbit B (1.7 Kg.) was given in one dose the juice expressed from 30 gm. of the leaves.

Result: Negative.

Euphorbia glauccella D.C.

Registered number: O.P.H. No. 156B; 5.4.39.

Common name:—

State and stage of development: The plant was wilted and in the early seedling stage.

Origin: Friedabrunn, Mariental, South West Africa.

Rabbit A (2.2 Kg.) was given 30 gm. of the plant in the course of 18 hours.

Result: Negative.

Rabbit B (2.4 Kg.) was given 60 gm. of the plant in the course of 18 hours.

Result: Negative.

Euphorbia sp. nearest *E. pubescens* Vahl.

Registered number: O.P.H. No. 10417; 9.12.39.

Common name:—

Origin: Hartebeestpoort Experimental Farm, Transvaal.

State and stage of development: The plant was in the fresh state and in the flowering stage.

Sheep 51420 (6-tooth; 43.2 Kg.) was given 6.2 Kg. of the fresh and wilted plant in the course of 9 days.

Result: Negative.

Jatropha capensis Sond.

Registered number: O.P.H. No. 30283; 12.12.38.

Common name:—

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was almost dry and without flowers or fruit.

Sheep 50397 (2-tooth; 37.5 Kg.) was given 600 gm. of the dry plant in the course of 5 hours.

Result: Negative.

The plant was found to yield 0.15 mgm. hydrocyanic acid per 100 gms.

GRAMINEAE.

Paspalum distichum Linn.

Registered Number: O.P.H. No. 1447; 15.5.39.

Common name: Buffalo-kweek.

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was in the dry state and in the late seeding stage. The seed heads were infected by *Claviceps paspali*.

Sheep 51364 (4-tooth; 19.3 Kg.) was given 6.8 Kg. of the fungus-infected grass in the course of 6 days.

Result: Negative.

IRIDACEAE.

Moraea setacea Ker.

(Figure 5.)

Registered number: O.P.H. No. 34235; 14.3.39.

Common name: "tulip", blue tulip, "blou tulp", "bokuintjie".

Origin: Ixopo, Natal.

State and stage of development: The plant was in the dry state and in the post-seeding stage. The bulbs of the plant were, however, still fairly fresh.

Sheep 52052 (6-tooth; 39.0 Kg.) was given 1.2 Kg. of the bulbs in the course of 3 hours on 14.3.39.

The animal died at approximately 8 p.m. on 14.3.39. When seen at 11 p.m. on 14.3.39 the abdomen was fairly distended.

Post-mortem appearances.—Advanced post-mortem changes: general cyanosis; petechiae in the thymus; marked hyperaemia and oedema of both lungs with froth in the air passages; slight hydrothorax and hydropericardium; slight hyperaemia of the mucosa of the caecum.

Rabbit A (1.2 Kg.) was given 90 gm. of the bulbs on 27.3.39.

The animal died during the night of 27.3.39.

Post-mortem appearance.—Fairly marked post-mortem changes; general cyanosis; fairly marked emphysema of both lungs; congestion of the liver and kidneys; stomach fairly distended; slight hyperaemia of the mucosa of the stomach.

Sheep 50524 (4-tooth; 40.0 Kg.) was given 400 gm. of the dried leaves.

Result: Negative.

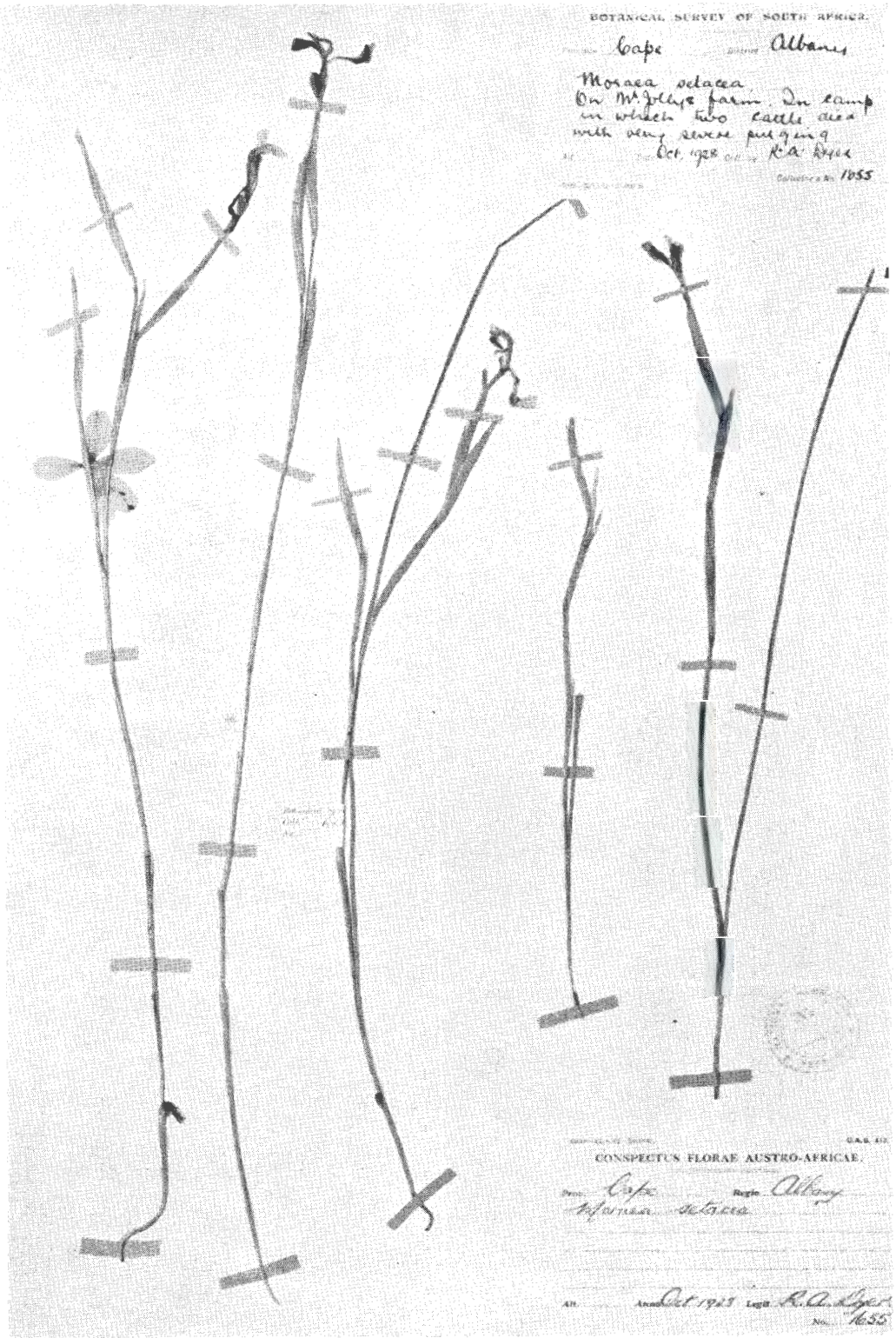
Provinc. Cape

Distric. Albany

Moraea setacea
On Mt. Jolys farm. In camp
in which two cattle died
with very severe putrefaction

Oct. 1925

Number 1055



CONSPECTUS FLORAE AUSTRALICAE.

Provinc. Cape Distric. Albany
Moraea setacea

ANNO 1925 LUGO R. A. LAGERBERG
No. 1055

Fig. 5.--*Moraea setacea* Ker.
272

LABIATAE.

Leonotis leonurus R. Br.

Registered number: O.P.H. No. 1915; 30.5.39.

Common name: Wilde dagga.

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was in the dry state and in the flowering stage.

Pig 71 (2 months old; 34.1 Kg.) was fed 520 gm. of the dry plant mixed with bran in the course of 2½ days.

Result: Negative.

LILIACEAE.

Bulbine longiscapa Wild.

Registered number: O.P.H. No. 5760; 7.9.39.

Common name:—

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was in the fresh state and in the early flowering stage.

Sheep 51451 (6-tooth; 32.8 Kg.) was given 4.0 Kg. of the fresh plant in the course of 30 hours.

Result: Negative.

Bulbine namaensis Schinz.

Registered number: O.P.H. No. 1389; 12.5.39.

Common name:—

Origin: Outjo, South West Africa.

State and stage of development: The plant was in the dry state without flowers or fruit.

Sheep 51753 (4-tooth; 18.4 Kg.) was given 650 gm. of the dry plant in the course of 4 hours.

Result: Negative.

Bulbine narcissifolia Salm. Dyck.

Registered number: O.P.H. No. 7265; 6.10.39.

Common name: Wilde kopieva.

Origin: Kokstad, Cape Province.

State and stage of development: The plant was in the fresh state and in the flowering stage.

TOXICITY OF KNOWN AND UNKNOWN POISONOUS PLANTS.

Sheep 51158 (6-tooth; 40·0 Kg.) was given 2·8 Kg. of the fresh plant in the course of 30 hours.

Result: Negative.

Ornithogalum subulatum Bkr.

Registered number: O.P.II. No. 6530; 22.9.39.

Common name:—

Origin: Swellendam, Cape Province.

State and stage of development: The plant was in the fresh state without flowers or fruit.

Rabbit A (3·4 Kg.) was given 120 gm. of the fresh plant in the course of 30 hours.

Result: Negative.

POLYGONACEAE.

Rumex acetosella Linn.

Registered number: O.P.II. No. 8319; 30.10.39.

Common name: Dock, sheep sorrel, sour dock, "boksuring" and "steenboksuring".

Origin: Oorsprongberg, Orange Free State.

State and stage of development: The plant was in the dry state and in the seeding stage.

Sheep 51158 (6-tooth; 37·3 Kg.) was given 1·0 Kg. of the dry plant in the course of 2 days.

Result: Negative.

SOLANACEAE.

Solanum macrosolum Fern.

Registered number: O.P.II. 11694-96; 11.1.40.

Common name: "Bitterappeltjies".

Origin: Krugersdorp, Transvaal.

State and stage of development: The plant was in the fresh state with immature and mature fruit.

Rabbit A (1·35 Kg.) was given in the course of 4 hours the juice expressed from 400 gm. immature fruit.

Result: Negative.

Rabbit B (3·2 Kg.) was given in the course of 5 hours the juice expressed from 400 gm. mature fruit.

Result: Negative.

Solanum quadrangulare Thunb.

Registered number: O.P.H. No. 1916; 30.5.39.

Common name:—

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was in the dry state, somewhat mouldy and without flowers or fruit.

Pig 73 (2 months old; 36.8 Kg.) consumed 430 gm. of the dry plant in the course of 2½ days.

Result: Negative.

SANTALACEAE.

Thesium namaquense Schltr.

Registered number: O.P.H. No. 5740; 7.9.39.

Common name:—

Origin: Richmond, Cape Province.

State and stage of development: The plant was in the dry state without flowers or fruit.

Sheep 52743 (6-tooth; 27.5 Kg.) was given 600 gm. of the dry plant in the course of 7 hours on 11.9.39.

11.9.39: 4 p.m. Apathy, slight tympanites; atony of the rumen; accelerated pulse and laboured respiration; expiration accompanied by groaning; conjunctivae red; slight paresis of the hindquarters.

The animal died during the night of 11.9.39.

Post-mortem appearances.—Advanced post-mortem changes; general cyanosis; tympanites of the rumen; petechiae in the epicardium; hyperaemia and oedema of both lungs.

VITACEAE.

Cissus sp.

(Figure 6.)

Registered number: O.P.H. No. 99A; 5.4.39.

Common name:—

Origin: Karibib, South West Africa.

State and stage of development: The plant was in the fresh state without flowers or fruit.

Rabbit A (1.4 Kg.) was given 20 gm. of the fresh leaves.

Result: Negative.

TOXICITY OF KNOWN AND UNKNOWN POISONOUS PLANTS.

Rabbit B (2.24 Kg.) was given 20 gm. of the fresh leaves.

Result: Negative.

Using the method of Rimington and Steyn (1933) the oxalate content of the fresh leaves of the plant was found to be 7.19 per cent. calculated as oxalic acid on the dry weight basis. The moisture content of the fresh leaves was 88.14 per cent.



Fig. 6.

In the course of investigating the poisonous plant problem in South West Africa in 1937 one of us (D.G.S.) had a most unfortunate experience with this plant growing in the mountains near Omaruru. A portion of the leaf, approximately the size of a sixpence, was chewed and the juice swallowed. Within a few minutes there was in the mouth and throat a sensation which is very difficult to describe. It was a kind of sensation of burning associated with a state of spasm of the pharynx which rendered the act of swallowing almost impossible. Attempts to swallow were immediately followed by a kind of retroperistalsis in the upper portion of the oesophagus. The sensation of burning spread down into the stomach. Taking food or drink was most uncomfortable for quite a number of days on account of the tenderness of the mucous membrane of the pharynx, oesophagus and stomach, and also because of the retroperistalsis in

the oesophagus. The above symptoms lasted for approximately two weeks. It is surprising that such a small portion of the leaf could produce such pronounced symptoms.

SUMMARY.

The toxicity of 22 plants was investigated. According to the available literature the following five of these plants were proved for the first time to be toxic: *Cryptolepis decidua* N.E.Br., *Cryptostemma calendulaceum* R.Br., *Helichrysum cephaloideum* D.C. var *adscendens*, *Kedrostis nana* Cogn. and *Moraea setacea* Ker.

ACKNOWLEDGMENTS.

Our thanks are due to Dr. E. P. Phillips, Principal Botanist, Division of Plant Industry, Pretoria, and to Mr. A. O. D. Mogg, Dr. R. A. Dyer and Miss Verdoorn, botanists in the Division of Plant Industry, for the identification of the plant specimens. To Mr. R. Clark of the Section of Pathology, Onderstepoort, we are indebted for the histological examination of animal organs. We also wish to thank Mr. M. G. van Niekerk for assistance rendered in the course of the experiments.

REFERENCE.

- REMINGTON, C., AND STEYN, D. G. (1933). *Psilocaulon absimile* N.E.Br. as Stock Poison I. Determination of oxalic, malic, tartaric acids, etc. *Onderstepoort Jnl. Vet. Sc. and An. Ind.*, Vol. 1 pp. 439-455.