

Recent Investigations into the Toxicity of known and unknown Poisonous Plants in the Union of South Africa VII.

By DOUW G. STEYN, Section of Pharmacology and Toxicology,
Onderstepoort.

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AIZOACEAE.

GALENIA AFRICANA L.

Registered number : O.P.H. No. 15851; 27.11.34. N.H. No. 19566.

Common name : Kraalbos.

Origin : Willowmore, C.P.

State and stage of development : Dry and in flowering stage.

Goat 41205 (1 year old, 18 Kg.): Received 50 gm. of dry plant per stomach-tube daily* from 8.4.35 to 30.6.35. The animal received a total amount of 3.6 Kg. of dry plant (=9 Kg. of fresh plant.) At no time were any symptoms of poisoning discernible. The animal was killed on 16.7.35 and the organs examined. No macroscopic or microscopic lesions were detectable in the internal organs.

Goat 41204 (1 year old, 15 Kg.): Received the same amount of dry plant as Goat 41205, also with negative results. No macroscopic or microscopic lesions were detectable in the internal organs of this animal, which was killed on 3.9.35.

Goat 41665 (1 year old, 20 Kg.): Received the same quantity of dry plant as Goat 41205 without developing any symptoms of poisoning.

* Except Sundays.

Goat 42918 (1 year old, 16 Kg.): Received 100 gm. of dry plant per stomach-tube daily from 8.4.35 to 30.6.35. At no time were any symptoms of poisoning discernible. The animal was killed on 15.7.35 and no macroscopic or microscopic lesions were detectable in any of the internal organs.

The animal received a total amount of 7.2 Kg. dry plant equivalent to 18 Kg. of fresh plant.

Goat 39821 (1 year old, 18 Kg.): Received the same quantity of dry plant as Goat 42918 with the same result. The animal was killed on 3.9.35 and no macroscopic or microscopic lesions were detectable in the internal organs.

Goat 38665 (1 year old, 15 Kg.): Received the same quantity of dry plant as Goat 42918 without developing any symptoms of poisoning.

Goat 41149 (3 years old, 26 Kg.): Received 300 gm. of dry plant per stomach-tube daily from 8.4.35 to 30.6.35. No symptoms of poisoning were discernible. The animal was killed on the 16.7.35 and no macroscopic or microscopic lesions were detectable in the internal organs. The total amount of dry plant administered to the animal is 21.6 Kg. equivalent to 54 Kg. of fresh plant.

Goat 42917 (2 years old, 30 Kg.): Received the same quantity of dry plant as Goat 41149 without developing any symptoms of poisoning.

Goat 42916 (3 years old, 33 Kg.): do.

All the above animals increased in weight in the course of the experiment. Those goats that were not killed were kept under observation for about six months after discontinuation of the drenching.

Discussion.

Many farmers in the Southern and Western Karroo maintain that *Galenia africana* is the cause of "waterpens" (hydroperitoneum) in goats. All we can conclude from this experiment is that the dry plant administered in the quantities mentioned above during a period of twelve weeks apparently has no ill-effects on goats. We have to consider the possibility of (a) the dry plant being less toxic than the fresh plant, (b) the plant having toxic effects when eaten over prolonged periods in amounts greater than those administered to the above experimental animals, and (c) the plant varying in toxicity in its different stages of development and in different years.

The only reliable way to determine whether the "kraalbos" is the cause of "waterpens", or not, is to conduct grazing experiments in the areas where the plant abounds. The experimental animals could then be forced to ingest much larger quantities of the plant than could be administered to them by stomach-tube.

ASCLEPIADACEAE.

PERGULARIA GARIEPENSIS N.E. Br.

Registered number: O.P.H. No. 9282, 11.12.35.

Common name: —

Origin: R. Schwarzkopf, Breckhorn West, Marienthal, S.W.A.

State and stage of development: Wilted and in early fruiting stage.

Sheep 40886 (4 years old, 50 Kg.): Received 250 gm. of the wilted plant per stomach-tube at 11 a.m. on 11.12.35. At 5 p.m. the animal was examined and no symptoms of poisoning were discernible. It was found dead in the stable at 7 a.m. the following morning.

Post-mortem appearances.—Interim—2 hours. Pronounced general cyanosis; pronounced injection of the subcutaneous blood vessels on the neck and front quarters; pronounced hyperaemia and slight oedema of the lungs; hyperaemia and degenerative changes in the liver; rumen distended with gas; and numerous pin-point haemorrhages in duodenal mucosa.

Histological examination of organs.—Fatty changes in the liver.

Sheep 39755 (4 years old, 45 Kg.): Received 250 gm. of the wilted plant per stomach-tube at 8.30 a.m. on 12.12.35. At 6 p.m. animal was restless walking about with short steps. It appeared stiff and paretic. There were pronounced laboured respiration and hoven. The pulse was accelerated but strong. The animal was found dead at 7 a.m. the following morning.

Post-mortem appearances.—In addition to the lesions described in sheep 40886 there was hyperaemia of the duodenal mucosa.

Sheep 40669 (Full month, 45 Kg.): Received 250 gm. of the dry plant per stomach-tube at 9 a.m. on 28.1.36.

No symptoms of poisoning were discernible until 6 p.m. and the animal was found dead at 7 a.m. the following morning.

Post-mortem appearances.—Pronounced general cyanosis; rumen markedly distended with gas; slight hydropericardium and hydroperitoneum; hyperaemia of the lungs with petechiae in the cervical portion of the trachea and extensive localised haemorrhage into the submucosa.

Rabbit (2.4 Kg.): Received 15 gm. of the dry plant per stomach-tube at 10 a.m. on 15.1.36.

16.1.36—apparently healthy. Another 30 gm. of dry plant in 2 doses. Within one hour after the second dose the animal developed weakness in the

neck, an accelerated and weak heart-beat and progressive paralysis until it was apparently completely paralysed. Death occurred about three hours after the second dose.

Post-mortem appearances.—Hyperaemia of the lungs and liver.

SARCOSTEMMA VIMINALE R. BR.

Registered No.: O.P.H. No. 3298; 2.7.35.

Common names: Melktou, spantou—melkbos.

Origin: Komaggas Reserve, Namaqualand.

State and stage of development: Fresh plant with no flowers or fruits.

Sheep 42538 (25 Kg.): Received 350 gm. of the fresh vines per stomach-tube at 4 p.m. on 2.7.35.

The animal was found dead at 8 a.m. the following morning.

Post-mortem appearances.—Pronounced general cyanosis; rumen markedly distended with gas; pronounced injection of the subcutaneous vessels in the front quarters; subepicardial and intramyocardial haemorrhages; hyperaemia of and degenerative changes in the liver; pronounced hyperaemia and oedema of the lungs with extensive haemorrhage into the submucosa and mucosa of the trachea and bronchi.

Sheep 42488 (45 Kg.): Received 450 gm. of the fresh vines per stomach-tube at 9 a.m. on 4.7.35.

5.7.35—8 a.m.: Apathetic, swaying gait, accelerated and weak pulse, laboured respiration. At 11 a.m. the animal was prostrate with the head thrown backwards and the legs extended as in strychnine poisoning; twitching of the eye-balls; general cyanosis; accelerated and superficial respiration; groaning; champing; dilatation of the pupils; continual clonic contractions of neck muscles (head shivering); and hoven. The animal was killed in a state of unconsciousness at 4 p.m. on 5.7.35.

Post-mortem appearances.—General cyanosis; rumen distended with gas; hyperaemia of the lungs; hyperaemia of and degenerative changes in the liver; hyperaemia of mucosa at bifurcation of the trachea.

Rabbit A (2.5 Kg.): Received the following quantities of the fresh vines per stomach-tube without suffering any ill-effects: 4.7.35—30 gm.; 5.7.35—60 gm.; 6.7.35—30 gm.; and 8.7.35—50 gm.

Rabbit B (2.7 Kg.): Received 60 gm. of the fresh vines daily for four days without developing symptoms of poisoning.

COMPOSITAE.

DIMORPHOTHECA NUDICAULIS DC.

Registered No. : O.P.H. No. 6654; 27.9.35.

Common names : Jakkalsgras, ox-eye daisy, wilde wit magriet.

Origin : Sandberg, Clanwilliam district.

State and stage of development : Wilted plant in the flowering and seeding stage.

Hydrocyanic acid test (Guignard test).

- (a) 10 gm. wilted leaves—strongly positive within 2 minutes.
- (b) 10 gm. wilted leaves + chloroform—strongly positive within a few seconds.
- (c) 10 gm. wilted leaves + emulsin—strongly positive within 1 minute.

In view of the large amount of hydrocyanic acid present in the plant it should be considered dangerous to stock.

HERTIA PALLENS (DC) O. KUNTZE.

(= OTHONNA PALLENS DC.)

Registered No. : O.P.H. No. 2747; 21.7.36.

Common names : Springbokbossie, vaalbos, dikkopbos.

Origin : Bestersput, Petrusburg district, O.F.S.

State and stage of development : In the post-seeding stage. The plant was dried in the shade.

Sheep 28519 (40 Kg.) : Received 150 gm. of dry plant per stomach-tube on each of 21.7.36 and 22.7.36. 23.7.36 8 a.m. .
Animal looked very ill; apathetic; fairly pronounced hoven; accelerated and strong pulse; temperature 99.4° F.; Bloody mucus exuding from both nostrils.

24.7.36: pronounced hoven; irregular and accelerated respiration; groaning; weak and accelerated pulse.

25.7.36: hoven; animal seemed "stupid" and took no notice of persons approaching her; resting nose on the ground when standing; swaying from side to side; accelerated and double breathing; death occurred at 10.45 a.m. on the 25.7.36.

Post-mortem appearances.—Pronounced general cyanosis; slight hydroperitoneum and hydropericardium; pronounced hyperaemia and slight oedema of the lungs; bloodstained mucus in the trachea and bronchi; subpleural emphysema in lungs; sub-endocardial haemorrhages in left ventricle; swelling and very pronounced fatty degeneration of the liver; cystic degeneration of the kidneys; pronounced

dilatation of the heart; yellowish gelatinous infiltration of the subcutaneous tissues on the ventral aspect of the neck and the mesentery; slight acute catarrhal enteritis; stasis in caecum and colon with hyperaemia of the mucosa; the uterus contained foetus approximately three months old.

Histology.—Pronounced fatty degeneration of the liver with slight interstitial hepatitis. No specific changes in the kidneys, lungs, lymphatic glands and spleen. Slight fatty changes in the myocard.

Sheep 42972 (40 Kg.): Received 300 gm. of dry plant per stomach-tube at 9 a.m. on 21.7.36. At 4 p.m. the animal exhibited laboured respiration and was found dead at 7 a.m. the following morning.

Post-mortem appearances.—White froth exuding from both nostrils; rumen distended with gas; pronounced general cyanosis; injection of the subcutaneous blood vessels; pronounced oedema and slight hyperaemia of the lungs; hyperaemia of and haemorrhages in the bronchial and mediastinal lymph-glands; haemorrhages in the tracheal mucosa; coagulated blood could be squeezed from some bronchi.

Histology.—Liver—central necrosis and slight interstitial hepatitis. No specific changes in the kidney and myocard.

Discussion.

The symptoms and post-mortem appearances (especially the macroscopic appearance of the liver) resemble those seen in cases of "domsiekte" in sheep to a certain extent. It would not seem unreasonable to suggest that at least some cases of "domsiekte" may be due to poisoning with the plant, *Hertia pallens*.

SENECIO GLUTINOSUS THUNB.

Registered No.: O.P.H. No. 5785; 13.9.35.

Common name: Ragwort.

Origin: Hopetown, C.P.

State and stage of development: Fresh and in the flowering stage.

Sheep 43795 (four-tooth, 35 Kg.): Received 600 gm. of the fresh plant per stomach-tube daily from 13.9.35 to 17.9.35, followed by doses of 400 gm. of the wilted plant on each of 18.9.35 and 19.9.35 and by doses of 300 gm. of dry plant daily from 20.9.35 to 23.9.35.

No symptoms of poisoning were discernible except that the temperature rose to 104-106° F. on a few occasions.

Discussion.

The toxicity of this plant was investigated as donkeys, which were grazing on a camp on the banks of the Orange River near Orange River Station, where the author found the above species of *Senecio* growing plentifully, developed typical symptoms of "dunsiekte" (seneciosis).

The fact that the above experiment yielded negative results is for various reasons by no means proof that this plant is non-toxic. According to observations made in the field it appears definite that this species of *Senecio* may in certain circumstances produce seneciosis.

SENECIO LAEVIGATUS.

Registered No. : O.P.H. No. 3627; 12.7.35.

Common names : Ragwort, sheep thrive (Queenstown).

Origin : Middeldrift, C.P.

State and stage of development : Fresh and in flowering stage.

Sheep 43448 (4-tooth, 35 Kg.): Received a total of 700 gm. of the fresh plant on two consecutive days. Result: negative.

SENECIO SP.

(Sent to Botanic Gardens, Kew, for identification.)

Registered No. : O.P.H. No. 2016; 5.6.36.

Common name : —

Origin : Roodekuil Estates, P.O. Warmbaths, Transvaal.

State and stage of development : Fresh and in flowering stage.

Sheep 38890 (45 Kg. full mouth): Received 800 gm. of fresh plant daily (except Sundays) from 5.6.36 to 13.6.36 and 300 gm. of dry plant from 14.6.36 to 16.7.36, that is a total of 6.4 Kg of fresh plant and 8.4 Kg. of dry plant in the course of 42 days.

Sheep 40752 (51 Kg., full-mouth): Drenched as sheep 38890. Result: At no time did the animals exhibit any symptoms of poisoning. They were killed on 23.7.36 and no macroscopic or microscopic lesions were discernible in the internal organs.

Alkaloids isolated from species of Senecio—Isatidine and Retrorsine.

A small quantity of *isatidine* and *retrorsine* isolated by Mr. J. J. Blackie, Holyrood Road, Edinburgh, Scotland, from *Senecio isatideus* and *Senecio retrorsus* respectively was kindly sent to us by Professor G. Barger, Department of Medical Chemistry, University of Edinburgh, Edinburgh, for experimental purposes.

It was our intention to produce, if possible, with these alkaloids cases of chronic seneciosis (*dunsiekte*) and acute seneciosis in horses. Unfortunately the limited quantity of the alkaloids allowed only of one animal being placed in each of the two experiments.

Horse 21305 (8 months old): Received 2.0 gm, *isatidine* in a small quantity of moist bran by means of a balling-gun at 9 a.m. on the 10.3.36. As the animal developed no symptoms of poisoning it was given 5.0 gm. *retrorsine* on the 11.5.36. It remained in good health and was killed on the 12.6.36 for post-mortem purposes. There were general hyperplasia of lymphoid tissue including the spleen and dilatation of the stomach. A large number of *Ascaris* and *Oxyuris* worms were present. Microscopically no lesions were detectable in the liver, kidney myocard and spleen.

Horse 21304 (8 months old: Received 0.1 gm. *isatidine* daily in a moist bran by means of a balling-gun from 10.3.36 to 27.4.36 and 0.2 gm. *isatidine* from 28.4.36 to 16.5.36.

Also this animal remained in good health up to the time it was killed (26.6.36).

Autopsy revealed the following: Abscessation of the bronchial glands; slight acute catarrhal enteritis; extensive infestation with *Ascaris*, *Anaplocephala perfoliata*, and *Habronema microstoma*.

Also in this case no lesions were detectable upon microscopical examination of the internal organs.

In spite of the fact that negative results were achieved with the above experiments it would appear that *isatidine* and *retrorsine* are responsible, to a certain extent at least for the production of seneciosis as Davidson (1935) was able to produce typical lesions in the liver of rats with these alkaloids.

Our negative results may be due to (1) individual resistance on the part of the two experimental horses; (2) the feeding of too small amounts of *isatidine* and *retrorsine*. It is possible, and perhaps probable, that the two plants may contain other alkaloids chemically and toxicologically closely related to *isatidine* and *retrorsine*. According to the amount of plant material equivalent to the quantity of the two alkaloids administered both horses should have died; and (3) the two alkaloids having been stored for too long a period before being administered to the horses. This period was approximately twenty-two months.

This delay in the commencement of the experiment was unfortunately unavoidable as we had to collect certain information in regard to Senecio poisoning before the above experiment could be conducted.

It is felt that our negative results with the feeding of *isatidine* and *retrorsine* are possibly due to the alkaloids having become inactivated (changed) during the long period of storage. It should be stated that the alkaloids were stored in brown bottles in a dark cupboard.

HIPPOCRATEACEAE.

SALACIA REHMANNI SCHINZ.

Registered No.: O.P.H. No. 11780A; 18.2.36.*Common name*: Wilde datel.*Origin*: Middelfontein, Nylstroom, Transvaal.*State and stage of development*: Wilted and in the late fruiting stage.

Rabbit A (2.4 Kg.): Received 10 gm. of the dry plant daily for three days.

Rabbit B (2.4 Kg.): Received 15 gm. of the dry plant daily for three days.

Result: Negative.

LEGUMINOCEAE.

CROTALARIA DURA WOOD AND EVANS.

Registered No.: O.P.H. No. 9569; 19.12.35.*Common names*: Jaagsiektebossie, wilde lusern, wild lucerne.*Origin*: The material was kindly collected in the vicinity of Pietermaritzburg, Natal, by Mr. R. A. Dyer, Botanist, Division of Plant Industry, Pretoria.*State and stage of development*: Wilted and in the flowering and early seeding stage.

Horse 21303 (8 months old): Fed 1 Kg. of the dry plant mixed with lucerne hay and green feed (barley) daily from 10.3.36. The animal took the mixture readily.

Result.—27.3.36—Conjunctiva dark-reddish laboured respiration (deep and double expiration), losing in condition, apathetic.

28.3.36—As on previous day and not feeding well, fluid faeces.

From 29.3.36 to 26.4.36 the animal grew progressively worse.

27.4.36.—Staggering about in stable with wounds on all prominent parts of the body; conjunctiva swollen and yellowish in colour; pronounced laboured respiration; pulse weak and accelerated. The animal was killed in extremis.

Elevation of the temperature was recorded from the 21.3.36 to 24.3.36 (101.2-102° F.).

Approximately 20 Kg. of dry plant was eaten up to 29.3.36 at the rate of 1 Kg. daily. From this date up to the time of death the animal took very little food. The total amount of dry plant eaten is approximately 25 Kg.

Post-mortem Appearances.—Generalized abrasions; slight general icterus; emaciation; degenerative changes in the myocard; localised atelectasis; early pneumonic foci (?) in the lungs; regressive changes and cirrhosis of the liver; slight ascites; marked pigmentation and infarction of left kidney; slight acute mucocatarrhal enteritis; *Anaplocephala perfoliata*, gastrophilus larvae, *Ascaris* and *Oxyuris* plentiful.

Histology.—No pronounced lesions are detectable in the internal organs.

CROTALARIA GLOBIFERA E. MEY.

Registered No.: O.P.H. No. 9568; 19.12.36.

Common names: Jaagsiektebossie, wilde lusern, wild lucerne.

Origin: Same as *Crotalaria dura*.

State and stage of development: Do.

Horse 21302 (8 months old): Fed 1 Kg. of the dry plant mixed with lucerne hay and green feed (barley) daily from 10.3.36 to 26.3.36. The total amount of dry plant eaten is 15 Kg. Unfortunately no more plant material was available.

Result.—At no time were any symptoms of poisoning discernible. The animal was killed on the 26.6.36 for post-mortem purposes. No macroscopic or microscopic lesions were detectable in the internal organs.

Owing to lack of knowledge of the difference in the botanical features of *Crotalaria dura* and *Crotalaria globifera* feeding experiments have in the past been conducted with mixtures of the two plants with the unfortunate result that *Crotalaria globifera* is also recorded to be toxic (Steyn, 1934). It is evident now that we have no experimental proof of the toxicity of *C. globifera*. It is possible that larger quantities of the plant than those fed to horse 21302 are required to produce poisoning.

LILIACEAE.

ORNITHOGALUM CALCICOLA.

Registered No.: O.P.H. No. 183; 7.4.36.

Common name: —

Origin: Tsumeb, S.W.A.

State and stage of development: Fresh bulbs with no flowers or leaves

Rabbit (2·4 Kg.): Received 20 gm. of the fresh bulb at 11.30 a.m. on 7.4.36 and 40 gm. on the 8.4.36.

Result.—At 4 p.m. on 8.4.36 the animal was apathetic and purged profusely. It died with symptoms of paralysis, at 8 a.m. on 9.4.36.

Post-mortem appearances.—General cyanosis; hyperaemia of the lungs and liver; pronounced acute catarrhal gastro-enteritis with haemorrhages in the gastric mucosa.

ORNITHOGALUM CAUDATUM TIT.

Registered No.: O.P.H. No. 11175; 6.2.36.

Common names: —

Origin: Division of Botany, Pretoria.

State and stage of development: Fresh bulbs and leaves and in post-flowering stage.

Rabbit A (2·45 Kg.): Received 100 gm. of the fresh plant on each of two consecutive days.

Rabbit B (2·4 Kg.): Received 200 gm. of the fresh plant on each of two consecutive days.

Result.—Negative. These results confirm those obtained in previous experiments.

MYRISTICACEAE.

MYRISTICA FRAGRANS HOUTT.

Common names: Nutmeg; neut.

Rabbit A (2·3 Kg.): Received 10 gm. of ground nutmeg on each of two consecutive days.

Rabbit B (2·6 Kg.): Received 20 gm. of ground nutmeg on each of two consecutive days.

Result.—Negative.

Dog 1690 (18 months old, 4 Kg.): Received 5 gm. of ground nutmeg per stomach-tube daily from 28.5.36 to 5.6.36.

Result.—4.6.36—animal vomited 15 minutes after having been drenched; losing in condition.

5.6.36—Vomited after having been drenched; apathetic; not feeding.

The animal became progressively weaker and thinner and suffered repeated attacks of vomiting. It died during the night of 14.6.36.

Post-mortem appearances.—Hyperaemia of and degenerative changes in the liver; fibrosis of the kidneys; no food in stomach and intestines.

Dog 1845 (18 months old, 9 Kg.): Received 20 gm. of ground nutmeg per stomach-tube daily from 28.5.36 to 5.6.36.

Result.—Animal vomited after each dose from 30.5.36. It did not feed well and was losing in condition. It however recovered within a week after discontinuing the administration of nutmeg.

Nutmeg is sometimes used in cases of criminal abortion and has frequently caused poisoning [Lewin (1929), Stolte (1935)]. Lewin states that one nut may be sufficient to induce symptoms of poisoning. Stolte quotes a case of a child who had received 1 gm. of powdered nutmeg in his soup daily in the treatment of diabetes. This treatment had no effect on the diabetes but the child developed an itching urticarial exanthema.

PROTEACEAE.

GREVILLEA ROBUSTA CUNN.

Registered No.: O.P.H. No. 12981; 16.3.36.

Common name: Silver oak.

Origin: National Zoological Garden, Pretoria.

State and stage of development: Fresh leaves from a tree in the late seeding stage.

Sheep 40752 (Fullmouth, 37 Kg.): Received 500 gm. of the fresh leaves daily for five days.

Result.—Negative.

SANTALACEAE.

THESIUM TRIFLORUM THUNB.

Registered No.: O.P.H. No. 10987; 28.1.36.

Common name: Gifbossie.

Origin: "Onbekend", Middelburg, C.P.

State and stage of development: Wilted and in fruiting stage.

Rabbit A (2.0 Kg.): Received 10 gm. of the dry plant on each of two consecutive days.

Rabbit B (2.45 Kg.): Received 15 gm. of the dry plant on each of two consecutive days.

Result.—Negative.

A second batch of this plant collected at the Grootfontein School of Agriculture, Middelburg, C.P., was dosed in the dry state and same stage of development to two rabbits with negative results.

UMBELLIFERAE.

FOENICULUM VULGARE MILL.

Registered No.: O.P.H. No. 3145; 11.7.36.

Common names: Vinkel, fennel.

Origin: Estcourt, Natal.

State and stage of development: Fresh plant with no flowers or seeds.

Rabbit (2.2 Kg.): Received 50 gm. of the fresh plant in one dose.

Result.—Negative.

VERBENACEAE.

VERBENA BONARIENSIS LINN.

Registered No.: O.P.H. No. 1196; 6.5.36.

Common names: —

Origin: Weenen, Natal.

State and stage of development: Almost dry and in the flowering stage.

Sheep 40752 (Fullmouth, 50 Kg.): Received 300 gm. of dry plant daily on four consecutive days.

Result.—Negative. No symptoms of photosensitisation seen.

ZYGOPHYLLACEAE.

ZYGOPHYLLUM MICROCARPUM LICHST.

Registered No.: O.P.H. No. 10432; 15.1.36.

Common names: Ou-ooibos, Armoedsbos, sandrepuis.

Origin: " Rooiberg Suid ", Maltahöhe, S.W.A.

State and stage of development: Fresh plant in the seeding stage.

Sheep 39750 (fullmouth, 50 Kg.): Received 600 gm. of the dry plant daily from 10.2.36 to 12.2.36 inclusive, and 300 gm. on 13.2.36.

Result.—11.2.36—slight hoven.

12.2.36—Fairly pronounced hoven; apathetic, not feeding well.

13.2.36—Pronounced hoven; dyspnoea; accelerated and strong heart-beat. Small quantity of ruminal contents flowing from nostrils.

14.2.36—Died previous night.

Post-mortem appearances.—Pronounced general cyanosis; abdomen markedly distended; subepicardial haemorrhages; hyperaemia of the lungs; liver and spleen decomposed.

SUMMARY.

Eighteen plants were tested biologically and one (*Dimorphotheca nudicaulis*) was tested chemically and found to contain a large quantity of hydrocyanic acid. In addition the effects of the alkaloids *isatidine* isolated from *Senecio isatideus*, and *retrorsine* isolated from *Senecio retrorsus*, were ascertained on horses. No positive results were however achieved.

Pergularia gariensis and *Ornithogalum calcicola* were proved toxic. No previous records of their toxicity could be found in the literature consulted.

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