

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

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AIZOACEAE.

Mesembryanthemum angulatum Thunb.

Registered number: O.P.H. No. 7363; 8.8.41.

Origin: Grahamstown, Cape Province.

Common name:

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

Sheep 59093 (6-tooth; 35.2 Kg.) was given * 4.0 Kg. of the plant in the course of 30 hours.

Symptoms.—Listlessness; anorexia; tympanites; dyspnoea; accelerated and weak pulse; slight diarrhoea; standing with arched back. The animal recovered.

Using the method of Rimington and Steyn (1933) the leaves of the plant were found to contain 1.72 per cent. of oxalates calculated as oxalic acid on the fresh weight basis. The moisture content of the leaves was 92.9 per cent.

ASCLEPIADACEAE.

Cryptolepis oblongifolia Schltr.

Registered number: O.P.H. No. 1820: 5.5.41; and 4781: 24.6.41.

Origin: Zeerust, Transvaal.

Common name:

State and stage of development: Both consignments of the plant were in the dry state and in the late seeding stage.

* Except where otherwise stated, all the animals were drenched by means of a stomach tube.

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Sheep 59262 (6-tooth; 42.8 Kg.) was given 1.0 Kg. of the first consignment of the plant (O.P.H. No. 1820; 5.5.41) in the course of 30 hours and sheep 59295 (6-tooth; 36.9 Kg.) 2.1 Kg. of the second consignment of the plant (O.P.H. No. 4781; 24.6.41) in the course of 3 days.

Result: Negative.

CHENOPODIACEAE.

Beta vulgaris L.

Registered number: O.P.H. No. 5780A: 14.7.41; 6305: 21.7.41; and 6306: 21.7.41.

Common name: Mangold.

Origin: Pretoria, Transvaal.

Deaths having occurred amongst sheep fed on mangolds, a quantity of the root was submitted for examination. Many of the roots were infected with fungi. The infected portions were minced and given to a rabbit as follows:—

Rabbit A (2.7 Kg.) was given 50 gm. at 10 a.m. on 15.7.41.

Symptoms.—10 minutes after dosing clonic spasms were observed; these were accompanied by loud and continuous crying. The rabbit died a few minutes later.

Post mortem appearances.—Emphysema and hyperaemia of the lungs; hyperaemia of the liver and kidneys; slight hyperaemia of the mucous membrane of the stomach.

Miss Bottomley, Division of Botany and Plant Pathology, Pretoria, who examined specimens of the roots, reports as follows:—"Various fungi are present including *Penicilium*, *Fusarium*, *Macrosporium* and an unknown species which is dominant."

Rabbit B (2.5 Kg.) was given, in the course of 30 hours, 200 gm. of the fungus-infected portions of a second consignment of the roots (O.P.H. No. 6305: 21.7.41).

Result: Negative.

Sheep 59246 (6-tooth; 43.2 Kg.) was given, in the course of 2 days, 1.8 Kg. of the partially dried roots of a third consignment (O.P.H. No. 6306; 21.7.41) which did not appear to be infected with fungi.

Result: Negative.

CRASSULACEAE.

Kalanchoe rotundifolia Harv.

Registered number: O.P.H. No. 1032: 18.4.41; and 1942: 6.5.41.

Common name:

Origin: Kimberley, Cape Province.

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

Sheep 59295 (6-tooth; 27.8 Kg.) was given 1.7 Kg. of the fresh leaves of the plant in the course of 24 hours on 21.4.41 and 22.4.41.

Symptoms.—21.4.41, 4 p.m.: Slight tympanites. 22.4.41 and 23.4.41: Listlessness; slight tympanites; accelerated and weak pulse; dyspnoea with a pronounced expiratory effort accompanied by a groan. The animal recovered.

Sheep 59229 (6-tooth; 36.9 Kg.) was given 300 gm. of the flowers of the plant in one dose.

Symptoms.—Listlessness; anorexia; conjunctivae dark red in colour; tympanites; pulse accelerated and laboured; dyspnoea with a pronounced expiratory effort accompanied by a groan; lying down continuously. The sheep died 36 hours after drenching.

Post mortem appearances.—Advanced post-mortem changes; general cyanosis; subepicardial petechiae; regressive changes in the myocardium; haemorrhages in the bronchi and trachea; emphysema, hyperaemia and oedema of, and haemorrhages in, the lungs; regressive changes, if such were present, in the liver and kidneys would have been masked by the post-mortem changes; slight hyperaemia of the mucosa of the small intestine and caecum, the contents of the former being blood-stained; pronounced tympanites of the rumen.

From the flowers and leaves of a second consignment of the plant (O.P.H. No. 1942: 6.5.41) extracts were prepared according to Steyn (1932). These extracts were inoculated subcutaneously into guinea pigs.

Extracts of the flowers: 1 c.c. represents 9 gm. flowers.

Guinea pig A (500 gm.): 15 c.c. at 12.10 p.m. Developed symptoms of cotyledonosis at 12.35 p.m. and died at 12.40 p.m.

Guinea pig B (500 gm.): 10 c.c. at 12.12 p.m. Developed symptoms of cotyledonosis at 2 p.m. and died at 3 p.m.

Guinea pig C (500 gm.): 5 c.c. at 12.15 p.m. The animal died overnight.

Extract of the leaves: 1 c.c. represents 25 gm. leaves.

Guinea pig D (500 gm.): 15 c.c. at 12.17 p.m. Developed symptoms of cotyledonosis at 12.21 p.m. and died at 12.25 p.m.

Guinea pig E (500 gm.): 10 c.c. at 12.20 p.m. Developed symptoms of cotyledonosis at 12.25 p.m. and died at 12.30 p.m.

Guinea pig F (500 gm.): 5 c.c. at 12.21 p.m. Developed symptoms of cotyledonosis at 1 p.m. and died at 2 p.m.

Both the leaves and the flowers of the plant contain cotyledon-toxin besides other poisonous principle(s). The quantities of cotyledon-toxin in the leaves and flowers are not such as to cause typical symptoms of cotyledonosis (krimpsiekte) in sheep and cattle.

CUCURBITACEAE.

Cucumis sp.

Registered number: Tox. Lab. No. 954: 2.6.41.

Common name: Vegetable marrow, maranc.

The material submitted for examination was prepared from six marrows, one of which was bitter.

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Rabbit A (2.45 Kg.) was given 60 gm. of the material in the course of 5 hours.

Rabbit B (2.5 Kg.) was given 125 gm. of the material in the course of 5 hours.

Result: Negative.

On the previous occasions marrows with a bitter taste were found to be very poisonous (Steyn, 1932a). In the above case the bitter marrow was mixed with five others with the result that the poison was highly diluted.

EUPHORBIACEAE.

Hyaenanche globosa Lamb. (*Toxicodendron capense* Thunb.)

Registered number: O.P.H. No. 3171: 29.5.41.

Common name: Hyaena poison, boesmangif, gifboom, wolwegif, wolweboontjie.

Origin: Clanwilliam, Cape Province.

State and stage of development: Immature fruit.

Rabbit A (1.9 Kg.) was given 10.0 gm. of the dry epicarp at 11 a.m.

Symptoms.—11.5 a.m.: Pulse accelerated and laboured; dyspnoea; paresis; clonic convulsions in which the limbs perform galloping movements.

11.15 a.m.: Attacks of tetanic convulsions such as are seen in strychnine poisoning. In the intervals between the attacks trembling of all the muscles of the body was observed.

The rabbit was killed *in extremis* at 11.45 a.m.

Post mortem appearances.—Pronounced emphysema of, and petechiae in, the lungs; congestion of, and slight regressive changes in, the liver and kidneys.

LABIATAE.

Leonotis leonurus R.Br.

Registered number: O.P.H. No. 2578; 17.5.41.

Common name: Wild dagga, klip dagga.

Origin: Kokstad, Cape Province.

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

Sheep 59093 (6-tooth; 40.0 Kg.) was given 2.1 Kg. of the plant in the course of 3 days.

Except for transient tympanites nothing unusual was observed.

LEGUMINOSAE.

Poinciana pulcherrima L.

Registered number: O.P.H. No. 1301: 24.4.41 ; and 2515: 15.5.41.

Common name: Bird of Paradise.

Origin: Kimberley, Cape Province.

State and stage of development: Both consignments consisted of leaves of the plant in the post-seeding stage. The leaves of the first consignment (O.P.H. No. 1301: 24.4.41) were fresh whereas those of the second consignment (O.P.H. No. 2515: 15.5.41) were dry.

Rabbit A (1.7 Kg.) was given 35 gm. of the first consignment in the course of 4 hours.

Result: Negative.

Rabbit B (2.7 Kg.) was given 90 gm. of the second consignment in the course of 10 days.

Result: Negative.

Rabbit C (3.2 Kg.) was given 30 gm. of the second consignment in the course of 24 hours.

Symptoms.—Two days after the commencement of dosing the following was observed: listlessness; accelerated pulse; dyspnoea. The rabbit died 2½ days after the commencement of dosing.

Post mortem appearances.—Pronounced hydrothorax; oedema of the lungs; slight hyperaemia of the mucous membrane of the stomach.

Rabbit D (2.4 Kg.) was given 110 gm. of the second consignment in the course of 5 days.

Result: Negative.

The leaves of the first consignment of the plant were found to be strongly positive for hydrocyanic acid with the picrate test.

LILIACEAE.

Anthericum sp. (probably sp. nov.).

Registered number: O.P.H. No. 2859: 19.5.41.

Common name: Witstorm.

Origin: Beaufort West, Cape Province.

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

Sheep 59074 (6-tooth; 33.2 Kg.) was given 400 gm. of the plant in the course of 40 hours.

Result: Negative.

Bulbine sp. affinis Bulbine longiscapa.

Registered number: O.P.H. No. 5698D: 5.9.39.

Common name:

Origin: Willowmore, Cape Province.

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

Sheep 51364 (6-tooth; 35.0 Kg.) received 2.4 Kg. of the plant in the course of six hours.

Result: Negative.

Dipcadi viride Moench.

Registered number: O.P.H. No. 20181: 21.3.41.

Common name:

Origin: Kimberley, Cape Province.

State and stage of development: The plant was in the fresh state and in the late-seeding stage.

Rabbit A (1.75 Kg.) was given 540 gm. of the bulbs of the plant in the course of 4 days.

Result: Negative.

Dipcadi sp. (probably sp. nov.)

Registered number: O.P.H. No. 6948D: 19.1.31; Nat. Herb. No. 10061.

Common name:

Origin: Klipdam, Cape Province.

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

Rabbit A was given 100 gm. of the fresh leaves and bulbs in one dose.

Result: Negative.

Ornithogalum thyrsoides Jacq.

Registered number: O.P.H. No. 4406: 16.6.41.

Common name: Chinkerinchee, tjienkerientjie.

Origin: Grahamstown, Cape Province.

State and stage of development: The plant was in the fresh state without flowers or fruit (post-seeding stage).

Bovine 8680 (1 year old) was given 1.8 Kg. of the bulbs and leaves of the plant in the course of 24 hours on 30.6.41 and 1.7.41.

Symptoms.—1.7.41-5.7.41: Listlessness; anorexia; emaciation; and severe diarrhoea.

7.7.41: As on the previous days except that the diarrhoea had ceased. In addition the pupillae had contracted to a small horizontal longitudinal slit and the pupillary reflex was found to be extremely sluggish. That the animal had gone blind was proved by the fact that on being driven it would run into any object in its way. Dr. Quinlan, of the Institute, kindly examined the eyes of the animal and found a pronounced dilatation of the blood vessels of the retina. Blindness persisted until the animal died overnight on 11.7.41.

This investigation was made as a result of a report received from Mr. J. Thorburn, Government Veterinary Officer, Grahamstown, concerning an outbreak of blindness in cattle. A high percentage of the animals, which showed profuse diarrhoea, remained permanently blind. There appears to be no doubt

that the cause of this disease was chinkerinchee poisoning. The persistent and very pronounced dilatation of the blood vessels of the retina most probably results in permanent damages (fibrosis) of the structure causing permanent blindness.

Post-mortem appearances.—Emaciation; general cyanosis; hydropericardium; subepicardial petechiae; regressive changes in the myocardium; emphysema and hyperaemia of the lungs; congestion and severe regressive changes of the liver; congestion of the kidneys; severe hyperaemia of the mucous membrane of the abomasum and small intestine; slight hyperaemia of the mucous membrane of the caecum, colon and rectum; erosive oesophagitis; hyperaemia of the mucous membrane of the urinary bladder.

Scilla oratifolia Baker form.

Registered number: O.P.H. No. 1862: 24.4.40.

Common name:

Origin: Amsterdam, Transvaal.

State and stage of development: The plant was in the fresh state and in the post-seeding stage.

Sheep 55528 (6-tooth; 41.4 Kg.) was given 1.5 Kg. of the fresh bulbs in the course of 6 hours.

Symptoms.—The animal died during the night following on the day of drenching.

Post-mortem appearances.—General cyanosis; tympanites; hydropericardium; subepicardial and subendocardial petechiae; ecchymoses in the thymus; severe hyperaemia and oedema of the lungs; congestion and regressive changes of the liver and kidneys; tumour of the right adrenal; hyperaemia of and haemorrhages in, the mucosa of the abomasum; hyperaemia of the mucous membrane of the duodenum, ileum and large colon.

Urginea rubella Baker (closely related to U. macrocentra Baker).

Registered number: O.P.H. No. 18644B: 27.1.41; 19688A: 19.2.41; and 20763: 11.3.41.

Common name:

Origin: Ermelo, Transvaal.

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

Rabbit A (1.8 Kg.) received 100 gm. of the bulbs of the first consignment of the plant (O.P.H. No. 18644B: 27.1.41) in one dose.

Symptoms.—The rabbit died 2½ hours after drenching.

Post-mortem appearances.—General cyanosis; hyperaemia and emphysema of the lungs; hyperaemia and regressive changes of the liver and kidneys; dilatation of the stomach; hyperaemia of the gastric mucosa.

Rabbit B (1.5 Kg.) was given 80 gm. of the fresh bulbs of the first consignment in the course of 24 hours.

Symptoms.—The rabbit was found dead 1 hour after receiving the last dose.

Post-mortem appearances.—General cyanosis; hyperaemia and emphysema of the lungs; hyperaemia of and regressive changes in the liver and kidneys; dilatation of the stomach.

Sheep 58752 (4-tooth; 34.1 Kg.) was given 800 gm. of the bulbs of the second consignment of the plant (O.P.H. No. 19688A: 19.2.41) in one dose.

Symptoms.—The sheep died during the night following the day of drenching.

Post-mortem appearances.—Advanced post-mortem changes; general cyanosis; slight hydrothorax, hydropericardium and hydroperitoneum; severe hyperaemia and oedema with slight emphysema of the lungs; tympanites of the rumen; very slight hyperaemia of the mucous membrane of the abomasum and small intestine.

Sheep 59163 (4-tooth; 36.4 Kg.) was given 200 gm. of the fresh bulbs of the third consignment in one dose at 3 p.m. on 13.3.41.

Symptoms.—14.3.41, 7 a.m.: Tympanites; dyspnoea; accelerated, weak pulse; anorexia; listlessness; lying down continuously. The animal died at 7.30 a.m.

Post-mortem appearances.—General cyanosis; hydropericardium; hydroperitoneum; subepicardial petechiae; hyperaemia and severe emphysema of the lungs; congestion and regressive changes of the liver and kidneys; tympanites of the rumen and abomasum; slight hyperaemia of the mucosa of the abomasum and small intestine.

Sheep 53385 (6-tooth; 39.1 Kg.) was given 100 gm. of the fresh bulbs of the third consignment at 4 p.m. on 17.3.41.

Symptoms.—The animal died during the night following the day of drenching.

Post-mortem appearances.—Advanced post-mortem changes; general cyanosis; subcutaneous haemorrhages; hydropericardium; hydrothorax; hydroperitoneum; subepicardial petechiae; severe hyperaemia and oedema of the lungs; tympanites of the rumen; slight hyperaemia of the mucosa of the abomasum and small intestine.

Sheep 53413 (6-tooth; 44.1 Kg.) was given 100 gm. of the fresh bulbs of the third consignment at 7 a.m. on 19.3.41.

Symptoms.—19.3.41, 4 p.m.: Slight apathy; slight tympanites; 10 p.m.: Apathy; slight tympanites; laboured respiration; pulse accelerated, weak and irregular. The animal died at 1.30 a.m. on 20.3.41.

Post-mortem appearances.—Advanced post-mortem changes; general cyanosis; hydropericardium; hydrothorax; hydroperitoneum; subepicardial petechiae; pronounced hyperaemia and oedema of the lungs; tympanites of the rumen; slight hyperaemia of the mucosa of the caecum; regressive changes, if such were present, in the liver and kidneys would have been masked by the post-mortem changes.

RUBIACEAE.

Pachystigma pygmaeum (Schl.) Robyns (*Gousiektebossie*).

The undermentioned experiments were conducted on behalf of Dr. Mes and Miss de Villiers of the University of Pretoria, who are engaged upon the isolation of the toxic principle(s) of the above plant.

Sheep 59074 (6-tooth; 40·0 Kg.) was given in one dose, 350 gm. of the dry leaves of the plant, collected at Kaalfontein, Pretoria.

Sheep 59012 (4-tooth; 35·0 Kg.) was given in one dose 92 gm. of the roots of the above plant.

Result: Negative.

Sheep 59134 (6-tooth; 40·0 Kg.) was given in one dose 350 gm. of the dry leaves of the plant, collected at Witfontein, Germiston.

Result: Negative.

Sheep 58758 (4-tooth; 40·0 Kg.) was given in one dose 250 gm. of the dry leaves of the plant, collected at Taaifontein, Bronkhorstspuit.

Sheep 59262 (4-tooth; 35·0 Kg.) was given in one dose 160 gm. of the above plant.

Result: Negative.

The following animals were given plant material collected at Kaalfontein, Pretoria. The plant was in the dry state and in the flowering and early seeding stages.

Sheep 58546 (6-tooth; 35·0 Kg.) was given 400 gm. of the plant in the course of 6 hours.

Sheep 59163 (4-tooth; 39·0 Kg.) was given 1·2 Kg. of the plant in the course of 2½ days.

Rabbit A (0·9 Kg.) was given 20 gm. of the plant in the course of 6 hours.

Rabbit B (1·1 Kg.) was given 60 gm. of the plant in the course of 2 days.

Rabbit C (1·9 Kg.) was given 100 gm. of the plant in the course of 4½ days.

Result: Negative.

The following animals were given plant material also collected at Kaalfontein, Pretoria. The plant was in the fresh state and in the seeding stage.

Sheep 53394 (6-tooth; 57·5 Kg.) was given 1·4 Kg. of the fresh leaves in the course of 4 days.

Sheep 53446 (6-tooth; 47·5 Kg.) was given 1·4 Kg. of the fresh leaves and 600 gm. of the dried plant in the course of 7 days.

Sheep 53411 (6-tooth; 50 Kg.) was given 1·4 Kg. of the fresh leaves and 1·8 Kg. of the dry plant in the course of 11 days.

Result: Negative.

SUMMARY.

The toxicity of fourteen plants was investigated. According to the available literature the following plants, viz., *Mesembryanthemum angulatum* Thunb., *Kalanchoe rotundifolia* Harv. and *Urginea rubella* Baker have for the first time

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been proved to be toxic. The results of the experiments with the fungus-infected mangolds and *Scilla oratifolia* Baker form. cannot be considered conclusive. *Poinciana pulcherrima* L. was shown to be a cyanogenetic plant and it was proved that *Ornithogalum thyrsoides* Jacq. is capable of causing blindness.

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Mesembryanthemum angulatum Thunb.



Kalanchoe rotundifolia Harv.



Urginea rubella Baker.