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C A. Gardner
Department of Agriculture

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POISON *Plants* OF WESTERN AUSTRALIA

by C. A. GARDNER,

(Government Botanist) and H. W. BENNETTS, D.V.Sc. (Principal, Animal Health and Nutrition Laboratories)

THE CAPE TULIP (*Homeria species*)

FOR countless ages the flora of Western Australia remained as a separate entity undisturbed by plant intruders, but following upon the arrival of the white man came a number of plants, some of which proved able colonists. These included useful plants such as the naturalised clovers; others such as the Cape weed developed here to an extent not to be observed in their natural home. Some of the plants now regarded as troublesome weeds were accidentally introduced by various agencies, while others were deliberately imported, but have since become widespread.

Viper's Bugloss, better known as Paterson's Curse, was originally introduced as a garden flower, while that troublesome pest, the "double-gee," is said to have been known as "Cape spinach," and was brought here to be used as a vegetable.

There were many other plants which were originally introduced to adorn the gardens of the early settlers. At first they were valued but later thrived so plentifully that they were neglected and finally cast out of the gardens but continued to reproduce themselves throughout the countryside.

Many of these plants have corms or bulbs and a number of these, especially those of the Iris family of Mediterranean or South African origin have become troublesome weeds under local conditions.

Among these we must number the Cape "tulps" or tulips. There is a story that the Cape tulip was introduced to this State by Sir Ferdinand

Mueller, then Government Botanist of Victoria, who distributed the plant to various people who collected specimens for the Victorian National Herbarium.

Among his collectors was Miss Julia Sewell, of York, and it is said that while at Youndegin, about 1870, she received seeds from "the Baron" and planted them at York. If this story be true it is not difficult to account for the early abundance of Cape tulip in the York district long before it became common in the metropolitan area.

Since the Cape tulip has become widespread in the South-West in many spots which have proved suitable for its growth, principally the low-lying sandy areas and alluvial clay soils farther inland. Today it is among our most serious weeds, triply endowed for its perpetuation by corms, by bulbils and by seeds.

In addition the plants are toxic, but losses are not common because stock do not appear to relish the plant when



A to I—ONE-LEAVED CAPE TULIP (*Homeria Breyniana* (L.) Lewis); A and B—Habit; C. and D—Corms (D in section showing development of lateral corm); E—Flower; F—Flower in lateral view; G—Ovary, stamens and styles; H—Fruit (capsule); I—Seeds (much enlarged).
 K to L—TWO-LEAVED CAPE TULIP (*Homeria miniata* Sweet); K—Habit; L—Bulblis.
 Metropolitan district.

green, and animals grazed in tulip country are careful to avoid eating toxic quantities. Heavy losses sometimes occur among stock brought down to tulip-infested areas from portions of the State where the plant does not grow. A further source of danger is by poisoning from dried plants which might be included in hay and chaff, for Cape tulip retains its poisonous properties when dried.

TOXICITY

Of the fifteen species of *Homeria* endemic in South Africa, seven are known to be toxic. Not all of these seven have been examined but an alkaloid *homeridine* has been isolated from *Homeria pallida*, Baker, which has pharmacological actions on the circulation similar to those of digitalis. This alkaloid is said to have no cumulative action. Three species—*H. Breyniana* (L.) Lewis, *H. minitata* Sweet, and probably *H. Lucassii* (L.) Bolus, possess a glucoside which has a digitalis-like action, while *H. aurantiaca* Sweet and *H. bulbifera* of which the toxic principle is unknown, have a digitalis-like action on the heart. *Homeria elegans* Sweet is reputed to be toxic, but apparently has not been tested.

SYMPTOMS

The corms of *H. Breyniana* eaten by South African natives produced severe nausea, vomiting, weakness, prostration, collapse, slowed and irregular pulse, and mydriasis. Two of four affected natives died about ten hours after having eaten the corms.

The following information regarding "tulip" (tulp) poisoning in South Africa is taken from Steyn's "Toxicology of Plants in South Africa."

All classes of stock are susceptible to "tulp" poisoning when fed with the plant, but under natural conditions cattle, sheep, goats and donkeys are most liable to suffer, whilst horses very seldom or never eat the plant under natural conditions. Tulip is of frequent occurrence on cultivated lands, and serious mortality occurs in stock fed with forage grown on lands where poisonous species of tulip grow. Desiccation has no effect on its toxicity.

Cattle: Non-lethal quantities of tulip cause inappetence, stiffness in the hindlegs, passing of urine at short intervals, abdominal pain, and diarrhoea, the animal recovering after a few days of illness.

It has often happened that transport riders have lost a number of oxen a few hours after they have outspanned and allowed the animals to graze where the tulip is prevalent.

When lethal quantities of tulip have been ingested symptoms commence with abdominal pain, which manifests itself by the groaning of the animal, the grinding of the teeth, looking around at the hindquarters, and by passing small quantities of urine at short intervals. If the animal survives for a time these symptoms are followed by a diarrhoea varying in degree from slightly fluid to bloody. The pulse, which at first is strong and accelerated, later on becomes very weak and even imperceptible. The respiration is superficial and hurried. There is a rise in temperature, which on account of the profuse diarrhoea drops below normal. The animal stands with the back arched and the abdomen "tucked up", and the ears and limbs are cold. Weakness, which is most pronounced in the hindquarters, steadily increases until the patient is unable to rise. Lachrymation and tympany are symptoms often seen in tulip poisoning. The animal walks with a swaying gait. Nervous symptoms, such as muscular twitchings, marked dullness and stertorous breathing, may be present. The animal dies in a state of collapse, passing liquid or blood-stained faeces every few minutes.

The most constant symptoms of tulip poisoning are colic, diarrhoea, tympany, and dullness. Very often the animals exhibit marked thirst, and if they survive for a few days there is a marked loss in condition. When large amounts of tulip have been ingested the animals die within a few hours and before diarrhoea appears.

Horses, mules and donkeys: The symptoms very closely resemble those described for cattle. The symptoms of colic are very severe; pulse and respiration are accelerated and a yellowish-green fluid diarrhoea supervenes. The animals may show icterus due to the swelling and consequent obstruction of the duodenal opening of the bile duct, thus causing stagnation of the bile. This condition may also be found in cattle provided they survive for a few days. The affected animals show an increasing dullness, standing with a drooping head. Weakness progresses and the animals, like cattle, die in a state of collapse.

Sheep and goats: The symptoms of poisoning are identical with those described in cattle.

POST-MORTEM APPEARANCES

The most common *post-mortem* lesion in acute and subacute cases is an acute gastro-enteritis, which may vary in degree from a slight catarrhal to a marked haemorrhagic. Furthermore, there may be present subepi- and subendocardial haemorrhages, congestion of the brain, hyperaemia and oedema of the lungs, hyperaemia of the kidneys, haemorrhages in the spleen and thymus. In peracute cases death as a rule occurs before the above lesions have developed.

TREATMENT

The treatment is purely symptomatic. Emollients, demulcents, and astringents counteract the gastro-intestinal irritation. As heart stimulants, strong black coffee, alcohol and camphor are indicated, whilst digitalis is contra-indicated. Steyn found potassium permanganate and tannic acid of no value in the treatment of sheep and rabbits suffering from tulip poisoning. These drugs were administered either per os or parenterally.

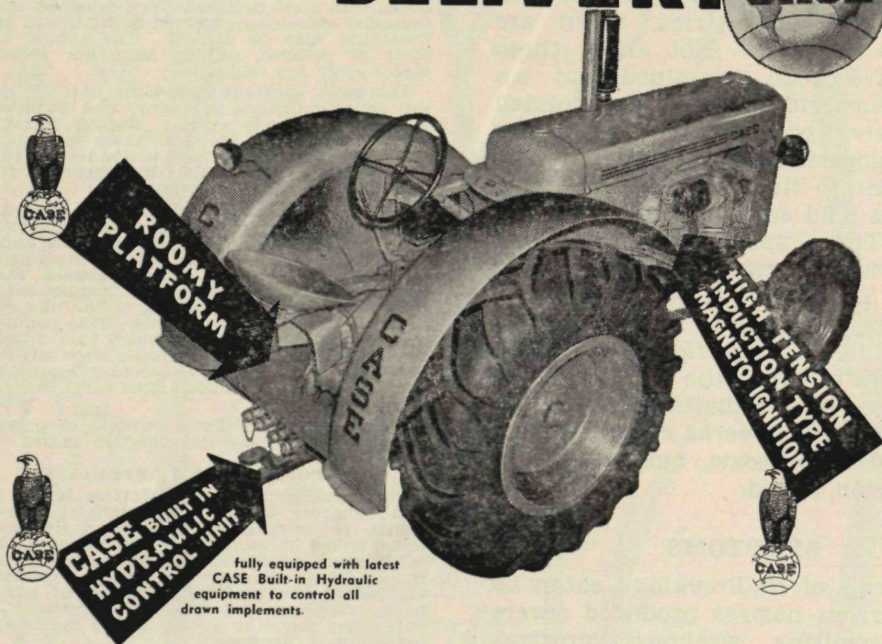
DESCRIPTION OF THE PLANTS

In conjunction with the plate accompanying this article, the following points should serve to distinguish the Cape tulips from other plants of somewhat similar appearance. Both possess corms, which might be termed solid "bulbs". The corm is covered with a

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number of thin fibrous somewhat latticed tunics which fall away in age. The roots are fibrous and rather thin. The exterior of the corm when its fibrous coat is removed, as well as the lower part of the leaf-sheath, is a rich yellow colour below the soil level (this is fairly characteristic). The corms are renewed annually as shown in the plate, and sometimes two corms are formed from one parent corm. Small stalked bulb-like or corm-like bodies known as "bulbils" are formed at the base of the parent corm. Each of these is potentially a corm.

The single stem is erect and enveloped by the sheathing base of the leaf or leaves which are deep green, much elongated, flaccid and prominently ribbed and entirely devoid of hairs or other clothing. The upper part of the stem is occupied by the inflorescence which is branched, each branch arising from a spathe which envelops the base of that branch. Each flower is similarly subtended by a spathe, rather thin and membranous, and soon becoming lacerated at the tip.

The flowers consist of a perianth of six segments or parts—three outer, and three inner—orange to orange-yellow or rarely yellow in colour, with a yellow or pale area at the base of each. The three stamens are placed opposite to

the outer perianth-segments and united in a tube in the lower part, the anthers being long and erect. The style emerges from the staminal tube and has three small petal-like orange-coloured branches which are notched at the summit and papillose on the outer margin. The ovary is inferior, i.e., is placed below the perianth, and resembles somewhat a stalk of the flower. It has three compartments and numerous ovules which ripen into globular seeds usually angled by pressure.

The fruit (mature ovary) is long and narrow, and has a cap-like extremity or operculum, and opens by splitting at the apex only. It is not enclosed in the spathe at maturity. Most species of *Homeria* possess but one leaf. The two naturalised species are the one-leaved Cape tulip (*Homeria Breyniana*) and the two-leaved Cape tulip (*H. miniata*). The latter can be distinguished from the former by the possession of two leaves, in the axils (inner bases) of which numerous stalked bulbils are formed. They are sometimes referred to as "cormlets". *Homeria Breyniana* was formerly known as *H. collina* Vent.

The name *Homeria* is from the Greek *homereo*, having reference to the union of the filaments of the stamens.

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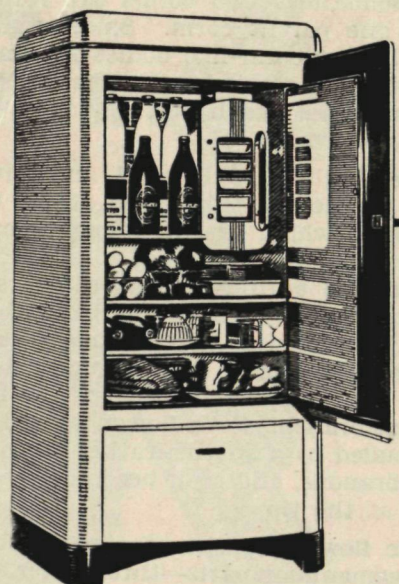
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