Weeds of Western Australia—Caltrop

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Caltrop is native to the warmer regions of the Old World, but has spread to most countries where suitable climatic conditions favour its growth. It has a wide distribution in Western Australia where its spiny fruits cause injury to the feet of stock. It has toxic properties, but no cases of caltrop poisoning have been recorded in this State.
SPIKED metal balls, known as "caltrops" were often used in medieval warfare, when areas of ground in front of defended positions were sown with these spikes to hamper the operations of enemy cavalry by crippling the horses. Although the fruits of Tribulus terrestris are not quite as severe in their effects, they do resemble the old implements of warfare and have taken their name.

Caltrop is native to the warmer regions of the old world, including tropical Australia, but has proved so adaptable to varying conditions of soil and climate that it has become a weed in practically every warm temperature country in the world. It occurs in every State of the Commonwealth and has a wide range in Western Australia, having been recorded from such places as Geraldton, Mullewa, Southern Cross, Merredin, Mukinbudin, Bruce Rock, Northam and the metropolitan area.

The manner in which this weed was introduced to the southern half of the State is not known with certainty but it could have originated from the north or alternatively have been imported in a variety of ways from other States or countries. The southerly movement of stock has probably been responsible for at least some of the occurrences. Caltrop produces a seed, or more correctly a fruit, which bears several spines and is somewhat similar in appearance to a doublegeez. As in the case of that weed also, the fruits are spread by animals and the spines serve to attach them to the rubber tyres of vehicles, including aeroplanes. The name "puncture vine" applied to this plant in the United States is self explanatory.

DESCRIPTION

As indicated by the species name "terrestris," Caltrop is a prostrate plant with spreading stems which may extend for a distance of several feet from the more or less woody tap-root. The stems, especially the younger parts, are usually covered with silky hairs. The leaves are borne in pairs on opposite sides of the stem and are comprised of several pairs of leaflets having the upper surface darker green in colour. Single flowers on short stalks arise from the base of the smaller leaves. They are pale yellow in colour and scarcely exceed one half inch in diameter. When the flower fades a woody burr of five segments is soon formed. The burrs are about one quarter inch long and one half inch broad and when ripe, readily separate into the five segments. Each of these is wedge-shaped and bears two stout spines near the apex with two smaller ones towards the base but directed almost at right angles to the other pair. Each segment contains two to five seeds.

SIGNIFICANCE

Caltrop has undesirable features in several directions. The burrs are capable of causing mechanical injury to stock, es-
CALTROP (Tribulus terrestris L.).
A—Habit; B—Leaf; C—Flower; D—Upper surface of burr; E—Lateral view of burr;
F—Separate carpel (lateral view) G—The same in longitudinal section showing seeds.

Premantle, R. D. Royce, Incon. origin.

Drawing by the Government Botanist, Mr. C. A. Gardner.
especially horses. The spines penetrate the frog of the hoof and cause painful suppurating sores. Burrs ingested along with other herbage have caused mechanical injury to the lining and walls of the stomach and intestines.

The plant also possesses certain toxic properties, although no cases of poisoning have been recorded so far in Western Australia. South African investigations have proved that, when eaten, it causes a condition known as Dikoor or Geeldikkop, the typical symptoms being photosenitization of the ears, lips and skin surrounding the eyes followed by swelling of the head. Similar symptoms were reported from two areas in Queensland during 1936 when heavy losses of sheep were associated with grazing on pastures in which caltrop was plentiful. Weaners appeared to be more severely affected but sheep of all ages were included.

Trouble has also been experienced in New South Wales and observations in that State indicated that losses are most likely to occur when green, succulent or rapidly-growing plants are grazed during hot days. The absence of losses in this State is probably due to the fact that, although Caltrop has been recorded from widely separated localities, in no place does it comprise a major proportion of extensive grazing areas.

Caltrop has been declared a primary noxious weed for the State.

CONTROL

Prevention is always the most economical method and care should be taken to avoid the introduction of seeds, especially with stock, chaff, machinery and rubber tyres—agencies that are also responsible for the spread of doublegees.

As with all annuals, prevention from seeding is the first line of attack. The plants are typically of summer duration. They grow rapidly and form seed in a very short period.

When isolated plants appear they should be hoed and destroyed by burning and a careful watch maintained for further germination. If mature burrs are present care should be taken to avoid scattering them while pulling or hoeing. In such cases, if only small patches are involved it is often more satisfactory to build a fire on the plants or use a weed burner.

American evidence has show that Cal­trop seedlings will continue to appear for at least eight years after all seeding has been prevented. In carrying out cultural operations to cope with more extensive areas these again should be undertaken before any seeding has taken place. Deep ploughing is inadvisable as the longevity of the seeds allows further germination when subsequent workings again bring them to the surface. Cultivation should be designed to destroy the plants and also to induce germination in order to exhaust the seed supply present in the soil.

Chemicals have been found very useful for caltrop control. The plants are killed by the application of oil sprays which can also affect the germination of seeds contained in dry burrs. On the farm, use can be made of old sump oil or a mixture of sump oil and diesolene or power kerosene.

The 2, 4-D or hormone-like preparations have also proved effective in comparatively weak solutions but, along with sodium chlorate and the arsenicals, have little effect on the germinating capacity of the seeds and therefore should be applied before flowering has commenced. Early spraying is also recommended when oils are used, for seeds in all burrs, especially those that are green, are unlikely to be killed by the treatment.

When the plants are small a solution containing one pound acid equivalent of 2, 4-D ester in 100 gallons of water is effective but with large plants the concentration should be doubled. Seedlings appear following late spring and summer rains and several treatments may be necessary in one season to cope with successive germinations.
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