3-1957

Weeds of Western Australia - Saffron thistle (Carthamus lanatus (Tourn.) L.)

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Saffron Thistle, or Star Thistle as it is sometimes called in this State, is native to the Mediterranean region and Western Asia. It was recorded as a bad weed in South Australia in 1887 and is now a problem in many cereal growing and pastoral districts in the Southern States. Although favouring heavy soils it is not entirely restricted to them.
REFERENCE has been made in other articles of this series to the confusion that may arise from several different vernacular names being applied to one plant. The weed frequently called Star Thistle in Western Australia is known as Saffron Thistle in most other places where it grows, and the name Star Thistle is applied to a different plant. Although difficult to alter well established usage it is desirable that Carthamus lanatus be called Saffron Thistle. This name has already been accepted in many districts and will be used in this article.

Saffron Thistle is native to the Mediterranean region and Western Asia but has become established in many countries and now occurs in all Australian States. The time and place of the first entry to Australia is not recorded but it was listed as a bad weed in South Australia in 1887 when legislation was passed in an attempt to cope with it.

Saffron Thistle is now widespread in New South Wales, Victoria and South Australia and is thoroughly established in a number of districts in this State. It has been recorded from places as far apart as Northampton, Meekatharra, Busselton, Salmon Gums and the Eastern Goldfields and occurs over thousands of acres within these limits. In some districts the in-

Fig. 1.—Saffron thistle growing on heavy soil at York
SAFFRON THISTLE
(Carthamus lanatus (Tourn.) L.)
A.—Flowering stem; B.—Head of flowers; C.—Leaf; D.—Upper portion of single flower; E.—Seed; F.—Seed scales.
(From a pen-drawing by C. A. Gardner, Government Botanist.)
festations are small, but in others, the weed is thoroughly established over extensive areas. It favours the heavier soils but is not entirely restricted to them.

DESCRIPTION

"Saffron" has been borrowed from the related species Carthamus tinctorius, the safflower of India and China, from which red and yellow colouring materials have been obtained along with a useful oil.

The plant is an annual with erect, rigid stems, two to seven feet in height, distinctly streaked with raised lines. The upper portions and branchlets are somewhat webby and woolly, at least when young. The leaves are short, rigid and spreading, bright green, prominently veined and spiny toothed. The lower leaves are shortly stalked while the upper ones clasp the stem. The single flower heads are surrounded by spreading leaves. The numerous florets comprising the flower head are intensely yellow. The grayish achenes ("seeds") somewhat resemble a shuttle-cock. A four-angled base about one-eighth of an inch long is surmounted by a fringe of semi-transparent scales.

SIGNIFICANCE

Sheep will eat the young plants if more attractive herbage is not available. The mature spiny plants, however, are seldom grazed, in fact often prevent stock from gaining access to useful forage. Cases of ulcerated mouths have occurred when animals have decided to try this harsh diet, while the sharp spines of the leaves have caused lameness by penetrating the hoofs.

A dense growth of Saffron Thistle reduces the carrying capacity of pastures and also causes a substantial reduction in the yield of crops, besides adding to the difficulties of harvesting. Cereal grain containing Saffron Thistle seeds is docked when delivered to the bulk bin.

The importance of controlling Saffron Thistle in a wheat crop is underlined by yields obtained last season at Manilla in New South Wales. Of 500 acres on one property 200 acres were sprayed with 2,4-D. This area produced 12 bags to the acre. The remaining 300 acres, similar to the sprayed crop in the soil type and yield potential, produced only seven bags to the acre and this wheat was not accepted at the silo because of the amount of Saffron Thistle it contained. Although not producing a burr such as Bathurst burr, the spiny seed-heads become entangled in wool and can be very troublesome.

Saffron Thistle is a declared primary noxious weed.

CONTROL

The spread of Saffron Thistle in Western Australia has been due, in the main, to the distribution of hay, chaff and grain containing seeds of the weed. Stock and machinery have also been responsible for its introduction to some districts. Any farm produce brought to a property should be examined for the presence of seeds of important weeds such as Saffron Thistle.

Being an annual, prevention of seeding is the primary consideration when planning control measures. It is important to remember that seeds will mature if plants are cut at the flowering stage without being destroyed. There is sufficient sap in the cut stems to allow a proportion of the immature seeds to develop fully.

Control is made more difficult by the fact that seeds may germinate over an extended period in any one season. The initial germination occurs in the autumn but some further emergence can be expected later, particularly if the soil is moist when temperatures commence to rise in the spring. The seeds also retain their viability for long periods in much the same way as wild radish. Clean paddocks have become reinfested as a result of ploughing bringing seeds to the surface and providing favourable conditions for germination. These characteristics of seed dormancy and an extended germination period accentuate the need for thorough and systematic control measures when dealing with Saffron Thistle.

The most practical method depends largely on the extent of the weed and the conditions under which it is growing. Cultivation, burning, cutting and spraying have all been used to advantage and often a combination of methods is the most satisfactory. There is a tendency to ex-
pect chemicals to solve our weed problems but in most cases, cultural methods remain the first line of attack and this applies in the case of Saffron Thistle.

When only isolated plants occur, they should be pulled or grubbed before flowering. If the flowering stage has been reached, the plants should be bagged and burnt, taking care not to distribute seeds.

Extensive and heavy infestations on arable land should be burnt, if possible, and ploughed as soon as practicable, after the germination of the weed in the autumn. The fallow should be kept clean by means of sheep, supplemented by harrowing when necessary. The area should be cultivated the following autumn, and seeding delayed as long as possible to allow plants resulting from the first germination to be destroyed. By sowing a crop for hay and cutting early, further thistles are cut before they set seed. The paddock can then be grazed and isolated plants destroyed by hand.

Besides destroying some of the seeds along with the trash, burning often facilitates other control measures. In some seasons it can be timed to prevent later plants from reaching maturity. This is possible when the other herbage will carry a fire before the thistles have formed seed.

Good results have been obtained by cutting, either with an orthodox mower or a rotary chain slasher. The terrain must permit close cutting and the operation must be timed carefully. If carried out too early, mature seeds may be formed on the regrowth, while late cutting may not prevent seed formation.

Although not as susceptible as wild radish and wild turnip, Saffron Thistle can be controlled by spraying with the growth regulating or 2,4-D herbicides. When the plants are at the young rosette stage—about two inches across—the application of 8 oz. acid equivalent per acre of 2,4-D ester or 12 oz. 2,4-D amine has been effective without being too severe on established pasture. When the plants have formed a rosette four to six inches in diameter at least 1 lb. acid equivalent of 2,4-D ester is usually necessary. With larger plants, especially when the flowering stem has appeared, 1/2 lb. acid equivalent per acre of 2,4-D ester is recommended and this should be increased to 2 lb. when the plants are nearing the flowering stage. Low volume application using 6 to 8 gallons of solution per acre has been as effective as spot spraying with 100 gallons per acre using a knapsack or wand from a power unit. Heavy grazing before treatment is desirable and further grazing later is also an advantage.

Experimental work carried out at Bal-lidu showed that Saffron Thistle is somewhat more susceptible to chemicals when growing in a cereal crop. When sprayed at the appropriate growth stage of both crop and weed, good control has been obtained with 8 oz. acid equivalent of 2,4-D ester per acre or 12 oz. of 2,4-D amine.
With our experimental work these rates of application have not affected the yield of cereals when applied at the "safe" stage i.e. when the plants are stooling and six to eight inches high.

Aerial spraying has also been undertaken both on grazing land and land under wheat. With this method of application increased rates are advisable and, based on our experience to date, 10 to 12 oz. acid equivalent of 2,4-D ester per acre is necessary when the weed is growing in a crop. In the case of grazing land, when the thistle is at the large rosette stage, this rate should be doubled. Clovers and trefoils are affected by the treatment.

Spraying is often delayed in order to locate the areas more readily and to ensure that maximum seedling emergence has taken place. We must keep in mind, however, that older plants are much more difficult to kill. In some cases they have recovered and set seed when sprayed at an advanced growth stage.

It is essential that control measures against Saffron Thistle should be planned in advance, as any programme, to be effective, must be carried on for several years. The control of this weed is most difficult on pastoral country where often large areas are involved and for various reasons, cultivation is seldom carried out. Eradication of Saffron Thistle in Western Australia is scarcely practicable but much can be done to reduce its effect on production. The present objective is to eradicate it from districts where the infestations are limited and make every effort to confine it in those agricultural areas where it is thoroughly established.
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