

# CONTROL OF TRIFFID WEED

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*Chromolaena odorata* (L.) K. & R. (Family Asteraceae), commonly known as triffid weed (English), paraffienbos (Afrikaans) or usandanezwe (Zulu), is of South American origin. It has invaded large parts of the Natal coastal belt and is also present in the north-eastern Transvaal in a limited area south of Tzaneen. It is a perennial shrub which assumes a scrambling habit when growing amongst trees.

Infestations develop into dense thickets within a few years. Further details concerning its appearance origin, distribution and reproduction are available in a separate pamphlet (Weeds A.17/1986; Farming in South Africa).

As biological control of triffid weed is still in the developmental stage, only mechanical and chemical methods of control are presently available. Both these methods are being implemented successfully, either separately or in combination depending on the end user and the particular situation.

## 1 INITIAL CONTROL

Recommended initial control operations for triffid weed growing in different situations are provided in Table 1. These must be read in conjunction with the relevant text for a particular technique; these are described below in section 4 and 5.

For the initial control operation, small isolated patches of triffid weed should be the priority as the severity of infestation is likely to increase. Dense impenetrable thickets cannot degenerate further.

## 2 FOLLOW-UP TREATMENTS

It is imperative that in the planning stage provision be made for follow-up measures. In addition to the already numerous triffid weed seeds on and in the soil, more of its wind dispersed seeds are blown in from other infestations. Germination of the seeds results in reinfestation of cleared areas. Also, the initial control operation is rarely 100% effective. In addition, removal of dense thickets provides suitable conditions for establishment of other weeds. Failure to control reinfesting triffid weed plants, triffid weed regrowth and other weeds results in the re-development of dense infestations in cleared areas.

Because the cost of the initial control operation is far greater than that of the follow-up treatments, it is sound practice to maintain

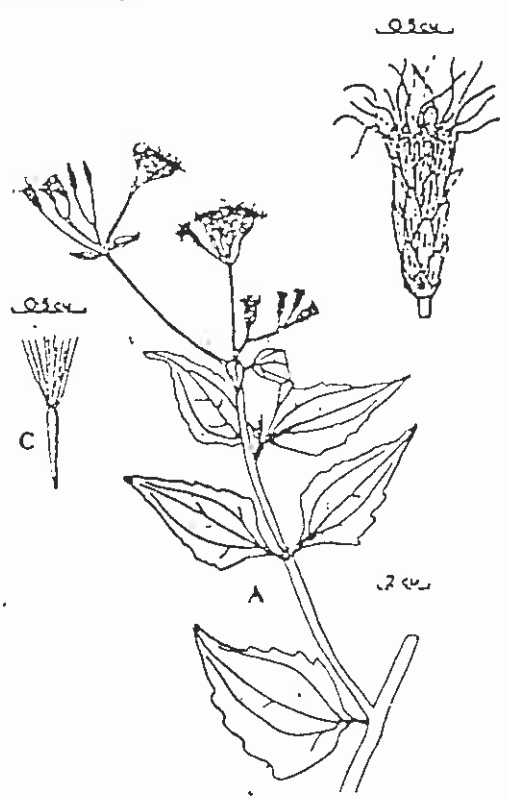


Figure 1 *Chromolaena odorata*

Although stems growing in close contact with the soil, root and/produce daughter plants, triffid weed reproduces predominantly by seed. White to cream flowers are produced in winter and the seeds are released in late winter/early spring to coincide with the onset of spring rains. The seeds are small (4 mm long) and resemble those of the common khaki weed (*Tagetes minuta* L.). The seeds are dispersed by wind. Seedling emergence takes place during spring and summer under suitable moisture conditions. The growth of the seedlings (and the coppice following slashing of plants) is extremely vigorous. If not controlled, small nuclear

cleared areas free of weeds.

**Follow-up treatment of previously cleared areas must be done BEFORE further initial control is done in new areas.**

Control of dense thickets should only start once isolated infestations have been eliminated.

Follow-up measures include hand-pulling of seedlings and spot spraying with Garlon or Roundup (see Table 2 for instructions). Follow-ups must be done at least annually and should become an integral part of the management strategy for that area. Dense stands of trifid weed seedlings must be expected in the first and possibly second year after the initial control operation and follow-up control effort will be high. However, thereafter a rapid decline in seedling numbers usually occurs. When this stage is reached, annual sweeps should be made. An attempt should also be made to revegetate cleared areas by, for example, oversowing or planting of grasses. This will help suppress trifid weed, increase the productivity of cleared areas and decrease the likelihood of erosion.

### 3 MECHANICAL VERSUS CHEMICAL CONTROL

Effective mechanical control can only be achieved by uprooting trifid weed plants. Chemical control is achieved by the application of registered herbicides. Mechanical control is generally used for small infestations comprised of a few isolated plants while chemical control is preferred for large infestations of many plants.

#### Cost

Slashing, which is labour intensive, is often the most costly operation in trifid weed control. Slashing is usually required for both mechanical and chemical control. The difference in cost of the two methods arises from the labour required for uprooting plants compared to the cost of herbicide + labour for application. Chemical control is generally more economical than mechanical control.

#### Environmental considerations

Mechanical uprooting of trifid weed results in soil disturbance particularly where large plants are present in dense thickets. This has two undesirable consequences.

-First, disturbance promotes soil erosion

especially on steep slopes and where trifid weed is virtually the only plant species.

-Second, soil disturbance results in exposure of trifid weed and other weed seeds present in the soil. Germination of these seeds leads to reinfestation and/or colonization of cleared areas.

Herbicides registered for trifid weed will kill other species. Selection and application of a herbicide for a particular situation is therefore critical.

### 4 MECHANICAL CONTROL

Trifid weed is a perennial and will regrow after being cut. It is therefore essential to uproot the plant.

(a) Seedlings/small plants up to 1 m tall - uproot by hand-pulling. In dry clay soils, first loosen earth (with hand-hoe, pick, mattock or garden fork).

(b) Sparse large plants taller than 1 m - to gain access to the base of plant, cut off lower branches or preferably all the topgrowth (with slashers or pangas) then loosen soil (with hand-hoe, pick, mattock or garden fork). Then remove roots by pulling on the remaining stump.

(c) Large plants in dense impenetrable thickets - cut away the topgrowth to expose the base of plants then uproot as for (b) above.

#### Tools

Brushcutters, cane knives and slashers can be used for cutting down the top growth. In addition to picks, mattocks and garden forks already mentioned, levers can be used for uprooting trifid weed plants but are cumbersome in dense vegetation and on steep slopes.

### 5 CHEMICAL CONTROL

The herbicide treatments registered for the control of trifid weed are presented in Table 2. Before applying any of the herbicides, it is essential that the label attached to the herbicide container be carefully read and understood. Any uncertainties must be clarified with the distributors before proceeding.

#### Application techniques

##### Soil application

Soil applied granular and wettable powder herbicides are registered (see Table 2). With the granular formulation (Graslan 20P), the required dosage of granules must be evenly scattered, by hand or aerially, throughout the infestation. With the wettable powder formulation (Reclaim), a specific volume of water containing the herbicide powder is squirted on to the ground at the base of each plant with a dose gun (see label for detailed instructions).

#### Note

- The efficacy of soil applied herbicides is affected by the clay content of the soil. The higher the clay content, the higher the dosage required and therefore the greater the cost.
- Soil applied herbicides are non-selective and will kill other plant species, especially trees and shrubs, whose roots occur in the soil in the region where the herbicide is to be applied. Therefore these herbicides **MUST NOT** be used in timber plantations, indigenous forest, gardens etc.

#### Foliar applied herbicides

Three broad situations for foliar application can be identified:

(a) Seedlings and plants less than 1,5 m in height (newly infested and reinfested cleared areas) can be sprayed with conventional knapsack sprayers or with more specialised equipment such as mistblowers. High volume vehicle-mounted sprayers could also be used if the infested area is accessible for such equipment.

(b) Where plants are greater than 1,5 m in height but sparsely distributed and accessible (infestations in marginal areas), specialised equipment such as mistblowers and vehicle mounted sprayers, as well as knapsack sprayers, can be used for herbicide application; and

(c) Where dense infestations of large plants greater than 1,5 m in height (as in well established infestations) are present, site preparation is usually necessary. Plants must be slashed near ground level and left to regrow (coppice). Herbicide application is then made by knapsack or mistblower to leaves of 0,5 - 1,0 m tall coppice approximately two months after slashing in spring or summer or three to four months if slashing is done in autumn or winter. Again, vehicle mounted sprayers can be used in suitable areas such as road verges and forest margins. A tractor mounted PTO sprayer with a Mondial fire-gun fitted with a 2 mm core

nozzle has been found to be especially useful for spraying road verges and tractor accessible forest margins infested with dense stands of predominantly trifid weed. Where grass is the desired vegetation cover subsequent to trifid weed control, then Garlon must be used as it is a selective broad leaf herbicide.

#### Note

With foliar applications, the following aspects need attention:

- Spraying in windy conditions must be avoided as spray drift on to desirable non-target species will occur.
- Only well trained personnel should contemplate the use of mistblowers.
- A rain-free period of at least half an hour for Garlon 4 and 6 hours for Roundup is recommended for best control.
- Spraying of drought stressed, wilted plants should be avoided as plants in this condition will also not absorb sufficient herbicide for a lethal dosage.
- In all cases, care must be taken to ensure good spray coverage of all the foliage.

In certain cases, the situations identified above for foliar application might be suitable for stump application.

#### Stump application

In situations where the plants have few stems of comparatively large diameter (20 - 60 mm), treatment of the stump is recommended. Plants must be cut at 100 - 150 mm above ground and the herbicide applied to the freshly cut surface of all stems on stumps. Application can be made either by paintbrush (for both Chopper in water and Garlon 4 in diesel) or by sprayer, using a coarse low pressure spray (for Garlon 4 in diesel). The cut surface and the bark of the stump and any exposed roots must be treated.

## 6 USE OF FIRE

Where grassland has been infested, fire can be used to reduce the trifid weed soil-seed bank and to provide some control. The plants must be slashed, as for preparation for mechanical or chemical control (described earlier), and left to dry for three to four weeks before burning. Burning must be done in accordance with the fire regulations (consult the local extension office of the Department of Agricultural Development for details). Any ensuing trifid weed seedlings and coppice must be controlled either mechanically or with foliar application of Garlon.

Situation	Height of plants	Density	Treatment
Vacant lots, rail and road reserves	Greater than 1.5m	Sparse, isolated	Cut and spot-spray knee high coppice with Garlon or loosen soil and uproot.
		Dense, touching	Cut and spray knee high coppice with Garlon.
Road verges, vehicle accessible forest/plantations on margins	All	Dense, touching	Spray Garlon with vehicle mounted sprayer with Mondial fire gun fitted with 2mm core nozzle.

TABLE 1 RECOMMENDED INITIAL CONTROL TREATMENTS FOR TRIFLID WEED IN DIFFERENT SITUATIONS

Situation	Height of plants	Density	Treatment
Grassland	Up to 1,5m	Sparse, isolated	Spot-spray foliage with Garlon or uproot. If sufficient fuel load is present, consider burning first then spot spray any ensuing coppice with Garlon.
		Dense, touching	If accessible to knapsack operator, spray foliage with Garlon. If too dense to walk through, cut and spray knee high coppice with Garlon. Consider burning option as for sparse infestation.
Grassland	Greater than 1,5m	Sparse, isolated	Cut and apply Chopper to freshly cut surface of all stems on stump or cut and uproot.
Indigenous forest	Up to 1,5m	Dense, touching	If plants have been burnt/cut previously and are multi stemmed, cut again and spray knee high coppice with Garlon. If there are few stems (up to 4 at 10 cm above ground level) cut and apply Chopper to freshly cut surface of all stems on stump.
		Sparse, isolated	Uproot, if growing in compacted soil, loosen before hand pulling.
Indigenous forest	Greater than 1,5m	Dense, touching	If accessible to knapsack operator, spray foliage with Garlon or Roundup. If too dense to walk through, cut and spray knee high coppice with Garlon or Roundup.
		Sparse, isolated	Cut and apply Chopper to freshly cut surface of all stems on stump or cut and uproot.
Plantations	Up to 1,5m	Dense, touching	If plants have been burnt/cut previously and are multi stemmed, cut again and spray knee high coppice with Garlon or Roundup. If there are few stems (up to 4 at 10 cm above ground level) then cut and apply Chopper to freshly cut surface of all stems on stump.
		Sparse, isolated	Spot spray foliage with Garlon or Roundup.
Plantations	Greater than 1,5m	Dense, touching	If accessible to knapsack operator, spray foliage with Garlon or Roundup. If too dense to walk through, cut and spray knee high coppice with Garlon or Roundup.
		Sparse, isolated	Cut and spot spray knee high coppice with Garlon or Roundup.
Gardens	All	Dense, touching	Cut and spray knee high coppice with Garlon or Roundup.
		All	Cut off topgrowth, loosen soil and uproot.
Vacant lots, rail and road reserves	Up to 1,5m	Sparse, isolated	Spot spray foliage with Garlon.
		Dense, touching	If accessible to knapsack operator, spray foliage with Garlon. If too dense to walk through, cut and spray knee high coppice with Garlon.

TABLE 2 HERBICIDE TREATMENTS REGISTERED FOR CHEMICAL CONTROL OF TRIFFID WEED

Trade Name	Active ingredient (Registration no.)	Site of application	Herbicide mixture (% concentration)	Further information
Graslan 20P	tebuthiuron 200g/kg (L 3560)	soil	granular ready-to-use	Distribute evenly under the canopy. <b>Not next to or in crops, orchards, plantations.</b>
Reclaim	tebuthiuron 752g/kg (L 3014)	soil	200g powder in 1 ℓ water	Dosage is dependent on soil clay content, refer to label. Apply as a spot treatment with an automatic vaccinator. <b>Not next to or in crops, orchards, plantations.</b>
Garlon 4	triclopyr 480g/ℓ (L 2353)	foliage	37,5 ml to 10 ℓ water (0,375%)	Plants taller than 1,5 m should be slashed and the coppice sprayed when 0,5 m tall. Add 50 ml Actipron wetter per 10 ℓ mixture.
Roundup	glyphosate 359g/ℓ (L 0407)	foliage	100 ml to 10 ℓ water (1,0%)	Plants taller than 1,5 m should be slashed and the coppice sprayed when 0,5 - 1,2 m tall. The addition of a wetter (Frigate, Armoblen, T-25, ammonium sulphate) is necessary.
Garlon 4	triclopyr 480g/ℓ (L 2353)	stumps	100 ml to 10 ℓ diesel (1,0%)	Slash plants at 10 -15 cm above ground. Apply mixture by paintbrush or low pressure coarse spray to freshly cut surface, bark and root crown of stump.
Chopper	imazapyr 100g/ℓ (L 3444)	stumps	500 ml to 10 ℓ water (5%)	Slash plants at 10 - 15 cm above ground. Apply mixture by paintbrush to freshly cut surface and bark of stump. <b>Not next to or in crops, orchards, plantations.</b>