

## MANAGEMENT OF PASSALI KODI, *ANREDERA CORDIFOLIA* TEN (STEENIS), A NOXIOUS WEED IN TEA PLANTATIONS

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### Introduction

*Anredera cordifolia* Ten. (Steenis), the Passali Kodi weed (*Wal nivithi*), has become widespread in many tea plantations, in the up- and the mid-country, and the Uva region, of Sri Lanka. This weed was first known as *Bassella alba* and *Anredera basselloides* but identified as *Anredera cordifolia* in 1999 (Ranamukaarachchi *et al.*, 2000). The non-adoption of preventive measures and regular plucking of overgrown Passali shoots have enhanced the rate of infestation.

Understanding the growth patterns of Passali Kodi, the causal factors for its spread, and adopting preventive control measures, are necessary to mitigate this weed menace. Some management strategies are discussed in this paper.

### Growth patterns of Passali Kodi

The Passali weed is mainly propagated by the bulbils or propagules, and the yams are produced underground (Ranamukaarachchi *et al.*, 1997). The bulbils grow aggressively when favourable conditions, such as high soil organic matter, good soil moisture, moderate shade (Anon., 1998) and low temperature, are available. Media such as refuse tea, green manure and tea-leaf litter have been found to be ideal for its profuse growth. As the seedlings emerging from bulbils or viable yams start to grow, the resulting vines climb through the tea bushes. When the vines reach the upper tea canopy, they start to branch vigorously, covering the plucking table and disturbing the growth of the tea shoots. This interferes with plucking.

Passali Kodi has a shallow root system which is mostly confined to the layer of litter. Some of the roots of a well-grown vine spread laterally to a distance of one metre or more. Food reserves in these roots, contributing to the weed's survival, occur in the form of starch. Bulbils produced at the stem nodes of the vines drop to the ground when they become mature. Flowering has been observed occasionally on well-grown, large vines. However, the weed is mostly propagated vegetatively by the bulbils.

## **Preventive measures**

- i) The addition of organic matter, such as compost, green manure, refuse tea and tea-leaf litter, to the affected fields should be temporarily suspended during an infestation, at least for one or two years. Further, transportation of compost or any other media from weed infested fields should be avoided.
- ii) In heavily infested fields, yams and seedlings should be removed manually, and piled up where they can be inspected regularly. If the yams and bulbils are dumped *in situ*, the piles can serve as breeding grounds of the weed, and the problem is aggravated. Using material containing yams and bulbils for making compost should also be avoided (Ranamukaarachchi *et al.*, 1997). The piles of weeds, together with yams and bulbils, should be turned over periodically to disrupt germination, or in the alternative a high dose (1.0-2.0%) of glyphosate solution should be sprayed when germination takes place. A surfactant could also be incorporated into the glyphosate solution.
- iii) Passali growing on fences and in waste-land, and vines climbing on trees should be totally destroyed. The vines should be cut from the base, and re-growth and small seedlings should be treated with the high dose of glyphosate.

## **Manual and chemical control measures**

The regular removal of Passali Kodi shoots growing above the tea canopy, when tea is being harvested, would result in multiple shooting of the weed, leading to faster growth and a covering of the plucking table, particularly during wet weather (Anon., 1997). Therefore, regular removal of the shoots of the weed, is not an appropriate method of control in suppressing the germination of bulbils, and the growth of seedlings underneath the tea bushes and in the inter-rows.

The bulbils produced on the stem nodes drop to the ground, but some are held in the primary frames, particularly of old tea bushes. These bulbils are not visible as the frame is fully covered by the tea canopy, and the bulbils germinate and grow to vines from time to time. Tea-leaf litter retained on the primary frame, and on the base of the tea bush, provides conducive conditions for bulbils to germinate. The manual removal of these bulbils, seedlings and yams from the primary frame, during mossing and ferning operations preceding pruning, helps to reduce the weed populations effectively.

A hand-fork could be used to facilitate collection of the yams and bulbils. The litter consisting of Passali yams, bulbils and pruned shoots could be buried *in situ* by cutting trenches in the tea inter-rows in flat land. In the alternative, the litter could be moved onto the tea inter-rows from the bases of the tea bushes. The further

infestation of Passali from yams and bulbils incorporated in the litter could then be chemically treated later, without affecting the tea bushes. Although, the cost of the operation is high, almost 80% of Passali populations could be checked with manual removal at the pruning stage.

Some of the bulbils fallen on the ground, and buried yams, may start to germinate with the onset of the rains. Seedlings, found in tea inter-rows and vacant patches, may be carefully treated with a cocktail mixture of glyphosate at  $3.0 \text{ l ha}^{-1}$  and diuron at  $1.2 \text{ l ha}^{-1}$  before bud-break in the tea. Application of herbicides to Passali shoots, which are growing over the plucking table, is not advocated.

Passali, growing along drains, roadsides, uncultivated areas and fences, could be sprayed with 1.0-2.0% glyphosate solution with incorporation of a surfactant. However, total control of the Passali Kodi weed is difficult to achieve using presently-available systemic or contact herbicides, owing to morphological characteristics of the weed, and the fact that it grows in close association with the tea crop (Anon., 1994, 1995, 1996, 1998, 1999).

Small bulbils can be washed away with rain-water to lower fields. Therefore, checking soil erosion may also help to minimize the dispersal of bulbils.

The growth of Passali Kodi is generally suppressed during dry spells. Seedlings growing from bulbils in tea inter-rows, particularly in pruned fields and on vacant patches, cannot withstand heavy sunlight, and therefore wilt or become desiccated. Bulbils, which remain alive, start to germinate with the onset of rains. Seedlings, shaded by the tea canopy, survive and grow to vines climbing through tea bushes.

## Conclusion

Rather than *ad hoc* methods, the adoption of a rational weed-management strategy, that includes manual, cultural, ecological and chemical methods, is a potentially viable solution to mitigate the effects of this weed.

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