

Information Bulletin on Biological Control of 'Hagonoy'

What is 'Hagonoy'?

'Hagonoy' *Chromolaena odorata* (L.) King & Robinson, is a weed belonging to the Asteraceae family which has now become so common in the Philippines since its introduction from South America through the country's southern backdoor in the 1960's.

Why is 'hagonoy' an economically significant weed?

- It grows rapidly under any agricultural situations, in cattle ranches, and under plantations;
- It is avoided by all livestock;
- It causes diarrhea when ingested or even fetal deaths among cows.
- It reduces the carrying capacity of the field to grow more beneficial weeds

How is it controlled?

- 'Hagonoy' is commonly controlled by slashing, burning, rolling and herbicide spray. These methods normally are time consuming labor intensive and often expensive.

How did 'hagonoy' attain its weed status?

- As an introduced weed, its natural enemies (herbivores) were left behind in its place of origin thereby allowing it to grow unhampered;
- The flowers of 'hagonoy' are airborne and may attach to clothing, mixed in seeds materials, sucked in by engines, through air currents and others;
- There is absence of herbivore or natural enemy on 'hagonoy' on its introduced range.;
- It spreads not only through seeds but by stem cuttings and rhizomes.

- It is resilient and regrows after a fire
- Its allelopathic principles prevent growth of most weeds within its immediate vicinity.
- The PCA-Davao Research Center in Bago-Oshiro, Davao City maintain a mass rearing facility in support of field releases.

Why control 'hagonoy'

Although some of uses may be derived from 'hagonoy', the advantages often outweigh the disadvantages. It is said to be a herbal cure for some skin infections and as a blood clotting agent on open wounds. It also contain nitrogen for soil amelioration. Control of the weed however hopes to achieve the following:

- To promote livestock integration under plantations where hagonoy normally invade;
- To restore the carrying capacity of the field for desirable weeds especially in ranches and range lands;
- To minimize labor for weed control;

Why biological Control Against "Hagonoy"?

Biological control is the utilization of organisms for the regulation of host plant, insect, or animal population densities.

Biological control against 'hagonoy' starts with exploration of herbivores in the origin of the weed particularly in South America where the weeds are kept at non-significant levels by the herbivore. Then the natural enemy is imported into the new host country, mass reared and released to the wild to regulate host population by feeding on the leaves, forming galls on stems, boring through the stems and feeding on the seeds and roots. These activities suppress weed growth and oftentimes succumb to the pressure. Biological control is relatively a long process but results are more permanent, less costly and environment-friendly.

The Herbivore, Gall-Forming Fly *Procecidochares connexa*

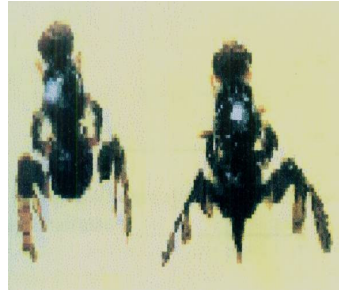
The PCA-Davao Research Center, after having been granted a permit, imported the stem-galling fly, *Procecidochares connexa* Macquart (Diptera : Tephritidae) from Indonesia ACIAR project CS2 96/91 "Biological Control of *Chromolaena odorata* in Indonesia, Papua New Guinea and the Philippines". A series of host specificity tests on 'hagonoy' and several other weed and tree species were conducted under the supervision of the National Biosafety Committee of the Philippines (NCBP) of the Department of Science and Technology (DOST). A year of testing showed that the gall fly was highly host specific to 'hagonoy'. In a parallel project in Indonesia which imported the flies in 1994 and release in 1995 the flies are now widely among *Chromolaena* in several islands.

Effect of the Gall fly on 'hagonoy'

The gall fly lays its eggs on practically all of the growing tips of 'hagonoy'. As much as 50 eggs are laid by a single female throughout its short lifetime of 1 to 2 weeks. In about 12 to 15 days the tips begin to swell as manifestation of the activity of the maggots inside. The gall attains a maximum of 9 by 13 mm in size and each contains from 2 to 10 pupae. Two months after egg laying the flies start to emerge. Egg -laying starts almost immediately after mating. Death to 'hagonoy' is often as a result of extreme pressure exerted by the fly where almost all shoots develop galls. The final dried-up 'hagonoy' show galls in every axil and in chains at tips.



A Healthy *Chromolaena odorata* thicket



The gally fly adult male (left), female (right)



A rich harvest of the galls for fly emergence inside laboratory



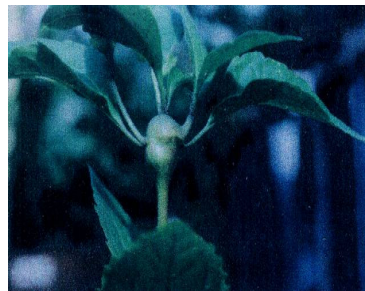
A portion of a 'hagonoy' stem which died of die back due to gall pressure



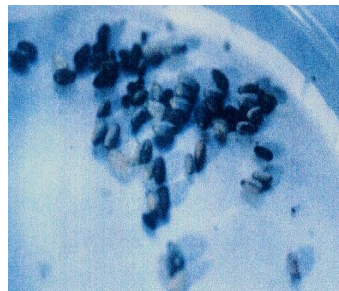
An adult female laying egg on host tip



Initial galling in 12 to 15 days



An enlarged gall containing from 2 to 10 gall fly larvae



Pupae of the gall fly

FOR ADDITIONAL INFORMATION

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