



National Agricultural Research Institute

Biological Control of *Chromolaena odorata*



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INTRODUCTION

Chromolaena (*Chromolaena odorata*) is one of the world's worst tropical weeds. In Papua New Guinea chromolaena occurs in localised areas such as Sandaun, Madang, Morobe, Oro, Milne Bay, East and West New Britain, New Ireland, Manus and Bougainville. The weed is increasingly becoming invasive and expanding its range. The arctiid moth *Pareuchaetes pseudoinsulata* and the stem-galling fly *Cecidochares connexa* have been successfully introduced, reared, and released at several locations infested by chromolaena.

DESCRIPTION, BIOLOGY AND ECOLOGY OF CHROMOLAENA

Chromolaena is a perennial scrambling shrub. It forms dense tangled bushes 1.5 to 3 meters in height, very occasionally reaching a maximum of 6 metres as a climber on other plants. It has a fibrous root system. The stems are round, hairy or almost smooth and profusely branched. The leaves are opposite, triangular, reddish purple when young, have toothed margins, three main veins and smells when crushed. The flowers are pale blue to white.

Cultural and chemical method of control can be applied in situations where there is serious economic or social implication if the weed is not controlled. Biological control is a long-term method to reduce weed problems such as chromolaena.



Galls form on the stem of Chromolaena



Adult fly laying eggs on the Chromolaena stem

control also has the potential to control chromolaena infestations even in difficult terrain. However, biological control will not eradicate the weed totally.

CHROMOLAENA BIOLOGICAL CONTROL AGENT INTRODUCED INTO PNG.

Moth (*Pareuchaetes pseudoinsulata*)

A moth *Pareuchaetes pseudoinsulata* was introduced from Guam in 1998 and has been mass-reared by NARI at Labu Livestock Center.

This moth was released in Sandaun, Morobe, Manus, East and West New Britain, and Misima

Island in Milne Bay. For the past 2 years scattered populations of *P. pseudoinsulata* have established along Erap Valley in Morobe. Erap

is the only release site where this agent is known to have established in PNG.

Stem Galling Fly (*Cecidochara connexa*)

This gallfly was introduced from the Philippines

in January 2001. Rearing has since been done

successfully with several field releases already made in Sandaun, New Ireland, East New Britain, Misima, Morobe and in the Ramu area of Madang. The gallfly has established in Morobe, Madang and Sandaun provinces

Seeds are 5 mm long, angled with hooks. In PNG, flowering occurs once between June and September, producing many seeds, which are capable of spread by wind or attached to humans and vehicles. The weed dies back after flowering, encouraging bush fires but can regenerate from the old stalk.

THE PROBLEM

Chromolaena has become a serious weed of:

- shifting cultivation
- coconut plantations
- cow paddocks
- riverbanks
- logging roads
- fallow lands
- edges of smallholder farms
- young oil palm blocks
- cocoa plantations
- wastelands
- newly cleared lands

- abundant lands
- roadsides
- cliff faces

Once established, it is difficult to eradicate. It suppresses other plants by competing for nutrients and water, overshadowing and by releasing growth inhibiting chemicals through dead leaves and the root system. Young leaves have high nitrate levels and if fed to animals over time can cause liver sclerosis and even death. In addition, Chromolaena can harbour crop pests and diseases. Chromolaena has the potential to spread to many parts of PNG and onto neighboring countries through the movement of people, vehicles, containers, heavy equipment and machinery.

MANAGEMENT STRATEGIES

Mechanical Control

Hand weeding, digging and uprooting of young plants can prevent further growth. Brush cutters, mowers, tillers, ploughs and other tractor drawn equipment can be used but at a cost. Slashing and burning is not effective because regrowth occurs quickly from rootstocks. Mechanical control provides short- term control.

Chemical Control

Tricopyr was found to be effective in controlling chromolaena at early seedling stages or early regrowth after slashing or burning. Other herbicides used include 2,4-D amine, glyphosate and picoram. Chemical control is effective but poses some environmental risks and it is expensive.

Cultural Control

Applying mulch, planting cover crops such as signal grass with legumes and shading has shown success in large plantations. Mechanical and cultural control must be implemented initially before carrying out cultural control.

Biological control

Several natural biological agents have been found from the native range of chromolaena and some of these agents have shown good results at controlling chromolaena in some countries. The advantages of applying biological method of control are; it is environmental friendly, the agents used are host-specific (they cannot feed on other plants), less expensive, benefit/cost ratio is very high compare to chemical control, avoid the use of pesticides and it is self-perpetuating. Biological