

Biological control of chromolaena in Micronesia

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Abstract

Chromolaena odorata established in the Mariana Islands in the early 1960s and had spread to most of the Micronesian islands by the early 2000s. The natural enemy *Pareuchaetes pseudoinsulata* has established in the Mariana Islands and Pohnpei while the gall fly *Cecidochares connexa* has established in Palau and Guam. The gall fly is being released in Saipan and host specificity tested in Pohnpei. The eriophyid mite *Acalitus adoratus* has fortuitously established in the East Caroline and Mariana Islands. Attempts are being made to eradicate the chromolaena infestation in the Majuro Island of the Marshall Islands.

Introduction

THE island groups in Micronesia associated with the United States of America are the Marianas, Carolines and Marshall Islands located in the western Pacific. The humid tropical climatic conditions of these islands are very suitable for *C. odorata*. The first herbarium specimen of *C. odorata* was collected on Guam in 1963. In the early 1980s, it became a problem in the Mariana Islands. During the 1980s, chromolaena spread to Palau, Yap, Pohnpei and Kosrae in the Carolines. It established in Weno Island of Chuuk (East Carolines) in the late 1990s and in Majuro Island of the Marshalls in 2001.

Biological control

Mariana Islands: The menace of chromolaena in Rota was brought to the attention of (RM) in 1983 and a project proposal was submitted to the Tropical and Subtropical Agricultural Research Program of the USDA. Upon approval of this project, *Pareuchaetes pseudoinsulata* Rego Barros (Lepidoptera: Arctiidae) was introduced from India and Trinidad in 1985 and established on Guam (Seibert 1989). Subsequently it was introduced and established on Rota

in 1985 and Tinian and Saipan in 1986. *P. pseudoinsulata* has effectively suppressed chromolaena thickets in all the four Mariana Islands.

In 1984, *Apion brunneonigrum* Beguin-Billecoq (Coleoptera: Apionidae) was introduced to Guam but it did not establish. The natural enemies *Mescinia parvula* (Zeller) (Lepidoptera: Pyralidae) and *Melanagromyza eupatoriella* Spencer (Diptera: Agromyzidae) were imported to Guam from Trinidad but no releases were made as *M. parvula* was difficult to culture in the laboratory and the shipment of *M. eupatoriella* was mostly parasitised. The eriophyid mite *Acalitus adoratus* Keifer (Acari: Eriophyidae) fortuitously established in the Marianas in the early 1990s. The introduction and establishment of *Cecidochares connexa* Macquart (Diptera: Tephritidae) in the Marianas has been reported elsewhere in this publication.

East Caroline Islands: the establishment of chromolaena in Yap and Palau were noted in 1987 and 1988 respectively (Muniappan and Marutani 1988). In 1988 three shipments of *P. pseudoinsulata* were sent to Yap from Guam. Even though releases were made at 14 different sites, *P. pseudoinsulata* was found established at only one site, Talaguw in a 10 m diameter area, in October 1988. It is not known whether establishment has sustained or died out as no follow-up studies have been made. Shipments of *P. pseudoinsulata* were also sent to Palau from Guam in March and April 1996 and October 1997. They were field released in Koror but no field establishment was observed.

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The eriophyid mite *A. adoratus* fortuitously established in Palau and Yap in 1988. A shipment of 26 females and 23 males of *C. connexa* was sent to Palau from Guam in February 1999. Host specificity tests were conducted on seven different species of plants. The insect was approved for release and then field released in October 1999 (Esguerra 2002). *C. connexa* has established well throughout the islands of Koror and Babelthuap in Palau.

West Caroline Islands: P. pseudoinsulata was imported from Guam in 1988. It was reared in the laboratory and field released from February 1989 to May 1990. In October 1990, field establishment was observed (Esguerra et al. 1991). From January to November 1992, shipments of *P. pseudoinsulata* were sent to Kosrae and field released at Tafunsak, Lelu and Utwe. Defoliation in the release sites were observed; however, it is not known whether it has permanently established in Kosrae (Esguerra et al. 1998).

Shipments of *P. pseudoinsulata* have been sent to Chuuk and field released since December 2002. A shipment of *C. connexa* was sent from Guam to Pohnpei and it is being reared in the quarantine laboratory for host specificity testing. It is planned to release *C. connexa* in the four FSM states (Chuuk, Kosrae, Pohnpei and Yap) in 2004.

Marshall Islands: Establishment of chromolaena in Laura, Majuro was observed in October 2001 (Muniappan and Nandwani 2002) and later in February 2003 near the International Airport (Van der Velde, pers. comm.). In both areas chromolaena has been cut and sprayed with herbicides in an attempt to eradicate it in the Marshall Islands.

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References

- Esguerra, N.M. 1998. The Siam weed infestation in the Federated States of Micronesia — Seven years of attempting to control it. In: Proceedings of the Fourth International Workshop on Biological Control and Management of *Chromolaena odorata*, Bangalore. 80–81.
- Esguerra, N.M. 2002. Introduction and establishment of the tephritid gall fly *Cecidochares connexa* on Siam weed, *Chromolaena odorata*, in the Republic of Palau. In: Proceedings of the Fifth International Workshop on Biological Control and Management of *Chromolaena odorata*, Durban, S.A., 2000. 148–151.
- Esguerra, N.M., William, W.S. and Smith, J.R. 1991. Status of biological control of Siam weed, *Chromolaena odorata* (L.) R.M. King and H. Robinson on Pohnpei, Federated States of Micronesia. Ecology and Management of *Chromolaena odorata*. BIOTROP Special Publication, No. 44: 99–104.
- Muniappan, R. and Marutani, M. 1988. Ecology and distribution of *Chromolaena odorata* in Asia and the Pacific. In: Proceedings of the First International Workshop on Biological Control of *Chromolaena odorata*, Ag. Exp. Sta., University of Guam, Mangilao, U.S.A., Bangkok, Thailand. 21–24.
- Muniappan, R. and Nandawani, D. 2002. Survey of arthropod pests and invasive weeds in the Republic of Marshall Islands. Marshall Islands Community College Publication No. 1.
- Seibert, T.F. 1989. Biological control of the weed, *Chromolaena odorata* (Asteraceae), by *Pareuchaetes pseudoinsulata* (Lep.: Arctiidae) on Guam and the Northern Mariana Islands. Entomophaga 34, 531–539.