



Grower Summary

PC 219

Risk Assessment and
Chemical Ecology of the
Red Lily Beetle,
Lilioceris lili (Scop.).

Annual report
September 2005

Project title: Risk assessment and chemical ecology of the red lily beetle

Project number: PC 219

Project leader &
research supervisor: Prof Wilf Powell
Rothamsted Research
Harpenden
Herts
AL5 2JQ

Academic supervisor: Prof. R. J. Hardie
Division of Biology
Imperial College London
Silwood Park Campus
Ascot
Berkshire
SL5 7PY

PhD student: Andrew Salisbury
Entomology
RHS Garden Wisley
Nr Woking
Surrey
GU23 6QB
Andrewsalisbury@rhs.org.uk

Report: Annual report September 2005

Previous reports: None

Location: RHS Garden Wisley, Surrey and Rothamsted Research,
Harpenden

Date commenced: 1 July 2004

Date to be completed: 30 September 2007

Whilst reports issued under the auspices of the HDC are prepared from the best available information, neither the authors nor the HDC can accept any responsibility for inaccuracy or liability for loss, damage or injury from the application of any concept or procedure discussed.

The contents of this publication are strictly private to HDC members. No part of this publication may be copied or reproduced in any form or by any means without the prior written permission of the Horticultural Development Council.

PC 219

Risk Assessment and Chemical Ecology of the Red Lily Beetle

Headline

The red lily beetle (*Lilioceris lili*) is the subject of a three-year research degree project being undertaken at Wisley Garden (Surrey), Rothamsted Research (Harpenden) and Imperial College (Ascot). Initial work has led to a better understanding of the beetle's biology and its responses to volatile chemicals in the environment.

Background and expected deliverables

The beetle is primarily a problem for the amateur and amenity lily (*Lilium*) grower in the UK, Holland and parts of North America. *Lilioceris lili* has one generation a year and a limited host range (*Lilium*, *Fritillaria* and *Cardiocrinum*). It is native to much of Eurasia and an established alien in North America and the UK. In the UK the beetle spread slowly across southeast England from 1939 to 1989, followed by a rapid increase in distribution; by 2005 it was widespread from North Yorkshire southwards, it is also established in Glasgow and Belfast. A biocontrol programme using three parasitoids (parasitic wasps) introduced from mainland Europe is underway in the USA; two of these parasitoids have been found in the UK.

This study was prompted by the increasing spread of lily beetle across the UK and its devastation of host plants.

The project has four main objectives:

- To investigate the biology and ecology of the red lily beetle.
- To use this information to assess the risk to the lily industry relating to pot plants, cut flowers and bulb production.
- To investigate the chemical ecology of both the lily beetle and its parasitoids.
- Using the results gained to develop integrated pest management strategies for the control of the red lily beetle for the amateur gardener, amenity horticulturist and the horticultural industry.

Summary of project and main conclusions

A laboratory culture of *Lilioceris lili* has been established. A field experiment that will enable a comparison of the susceptibility of six lily varieties to *L. lili*, has been initiated. The ongoing trial will also provide data on the lifecycle of *L. lili* under natural conditions. It is intended that the trial will run for three years.

Initial laboratory investigations with *L. lili* adults indicate that, like many insects, the behavioural responses of *L. lili* to its host plants and each other are at least in part odour-mediated. Further tests are planned to provide additional insights into this odour-mediated behaviour and identification of the volatile chemicals involved.

Methodologies have been developed from those used at Rothamsted Research for the collection of volatile chemicals from *L. lili* and its hosts. Methods that are likely to be used to identify compounds that elicit responses in *L. lili* have been identified.

Other work that is planned includes a reanalysis of the spread of the beetle in the UK and a postal survey to provide additional information for the risk assessment for the UK lily-growing industry.

Financial benefits

Currently there are no financial benefits to be gained by growers from this work.

Action points for growers

Currently there are no recommended changes to grower practice regarding the lily beetle.