MINIMISING THE THREAT OF LEPIDOPTERAN BORERS TO THE AUSTRALIAN INDUSTRY

By

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Abstract

Lepidopteran stemborers are the major pests of sugarcane in almost all overseas industries, but the Australian industry is currently free of these borer pests. A current project is developing strategies to respond to incursions of borers; Sesamia borers are the first group being considered. All sectors of the industry and government agencies are involved with the development of incursion management plans. The project draws on experience in borer management from overseas and on incursion responses within Australia. It will provide proactive data for registration of insecticides and importation of biological control agents and will allow the rapid and accurate identification of larvae in any incursion.

Introduction

The insect-pest fauna of sugarcane is dominated by local, endemic species that have adapted to the crop after its introduction (Strong et al., 1976). Of the 1286 species identified by FitzGibbon et al. (1998) as associated with the crop, only a handful are truly ‘tramp’ species. The pest fauna in Australia is no exception, but one element, dominant in most other sugarcane-growing areas, is absent—lepidopteran stemborers.

The Australian sugar industry has benefited from its geographic and geological isolation. However, its proximity to New Guinea, one of the centres of evolution of the genus Saccharum, and increasingly freer and more rapid trade and movement of peoples mean that we can not rely on this isolation to protect us from incursions of new pests. The incursion of stemborers represents the greatest pest threat to the continued profitability and sustainability of the Australian industry (FitzGibbon et al., 1999).

Quarantine is obviously the first line of defence against any incursion, but procedures should be in place to rapidly deal with any pest that escapes such defences. The Australian industry has developed a generic Pest Incursion Management Plan (Allsopp et al., 2000), and this is being extended to give more detailed plans for specific groups of stemborers and generally improve the Australian industry’s preparedness for any incursion. The genus Sesamia is the first to be considered.

General approach

Sesamia stemborers occur through Africa and southern Europe, east through the Indian subcontinent, to southern China and Japan, and through southeast Asia to new Guinea (Rao and Nagaraja, 1969). Three groups of species are pests of sugarcane:

1. The African and southern European S. cretica, S. nonagrioides (including S. n. botanephaga), S. penniset, S. calamistis and S. peophasa—These species are primarily pests of sorghum and maize, but infest a wide range of other grasses, including sugarcane. On sugarcane, they are primarily shoot borers.
2. The Asian S. inferens and S. uniformis—These species also feed on a wide range of grasses, but are more commonly associated with sugarcane. They primarily attack young shoots.
3. The New Guinean S. grisescens (and possibly S. arfaki)—S. grisescens appears to have evolved with Saccharum spp. over a long period and to prefer sugarcane as its host plant. It is the most important pest at Ramu Sugar, Papua New Guinea, damaging mature canes and causing crop losses as high as 31 tonnes of cane per hectare (Kuniata, 2000). These groups pose different threats and different management responses for the Australian industry: the sorghum and maize industries would be important participants in dealing with any incursion of the African or Asian species; S. grisescens would probably affect only the sugar industry, but could have a wider host range in the more diverse Australian cropping landscape; species boring only in young shoots would have a lower economic impact than a species, such as S. grisescens, that bores in more mature stalks.

Specific approach

Our current work particularly targets S. grisescens (responses are based on the IPM tactics developed at Ramu Sugar by Kuniata and colleagues) and focuses on:

- developing accurate and rapid methods for the identification of larvae—larvae of Sesamia spp.

KEYWORDS: Pest Incursions, DNA Identification, Pest Management, Sesamia, Insecticides.
are difficult or impossible to separate morphologically; adults are required for accurate determination. We are developing DNA-based techniques to allow rapid identification of larvae and, hence, implementation of appropriate responses;
• developing dossiers and pest-incursion management plans specific to each major exotic borer species;
• implementing pheromone-based early detection methods for adults;
• paving the way for importation of important parasites of exotic sugarcane borers;
• developing emergency-use permits for offlabel use of insecticides against exotic borers;
• developing a better awareness in the industry of the threats posed by exotic borers and of the appropriate responses and testing those responses.

Conclusion

This project (partially funded by the Sugar Research and Development Corporation) will develop responses to deal with incursions of borers. All sectors of the industry and government agencies are involved with the development of incursion management plans. The project draws on experience in borer management from overseas and being developed within associated projects.

REFERENCES


MINIMISER LA MENACE QUE CONSTITUENT LES FOREURS LEPIDOPTERES POUR L’INDUSTRIE SUCCRIERE AUSTRALIENNE

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Résumé

Les foreurs de tiges lépidoptères sont les principaux ravageurs de la canne à sucre dans la plupart des pays producteurs: toutefois ces ravageurs n’ont jamais inquiété l’industrie sucrière australienne jusqu’ici. Un des projets en cours consiste à développer des stratégies qui permettraient de faire face à une éventuelle introduction de ces ravageurs; les foreurs Sesamia étant les premiers considérés. Tous les secteurs de l’industrie et des agences gouvernementales sont impliqués dans ce projet, basé sur l’expérience des pays outremer dans le contrôle de ce ravageur et sur les mesures prises en Australie, dans des cas d’introduction. Cette étude fournira des données proactives pour l’homologation des insecticides et l’importation d’agents de contrôle biologique et permettra l’identification rapide et précise des larves en cas d’introduction.

Mots clés: Incursion des ravageurs, identification ADN, contrôle des ravageurs, Sesamia, insecticides.
MINIMIZANDO LA AMENAZA DE LOS BARRENADORES LEPIDOPTEROS A LA INDUSTRIA AUSTRALIANA

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Resumen

Los barrenadores del tallo representan la plaga más importante de la caña de azúcar en la mayoría de los países del mundo que la cultivan, pero en Australia normalmente no se presenta este tipo de plaga. Actualmente existe un proyecto que desarrolla estrategias para enfrentar las incursiones de estos barrenadores. Aquellos que se incluyen dentro del género Sesamia conforman el primer grupo para ser considerado. Todos los sectores de la industria y las instituciones del gobierno se han involucrado en el desarrollo de planes de manejo de estas incursiones. El proyecto considera las experiencias en el manejo de los barrenadores logradas fuera de Australia, al igual que las respuestas observadas en Australia. Suministrará información comprobada para el registro de insecticidas e importación de agentes de control biológico y permitirá una identificación rápida y precisa de las larvas en cualquier incursión.

Palabras claves: Incursión de plagas, identificación de DNA, manejo de plagas, Sesamia, insecticidas.