

## Without Insecticides, 1.2 Billion Pounds of Sugar from Australia Would Not Be Produced

*International Pesticide Benefits Case Study No. 41, November 2011*

*Leonard Gianessi and Ashley Williams*

Sugarcane is grown in Australia on 450,000 hectares along the eastern coast. The Australians harvest about 30 million tonnes of sugarcane each year, producing about five million tonnes of raw sugar (eighty percent of which is exported, mainly to East Asia). Following harvest, the sugarcane plant has the ability to re-grow from the underground root system and produce an economic yield for up to five years from the first planting.

Native canegrubs — the larvae of nineteen species of beetles — have been pests of Australian sugarcane almost since the crop was first grown. Adult beetles feed on tree leaves and do not cause crop damage. Each female beetle can lay 60 eggs. They lay their eggs mostly in sugarcane crops; when the eggs hatch, the larvae feed on the sugarcane roots. The roots are unable to draw sufficient moisture and nutrients for plant growth. Damaged cane is stunted, lodges readily, and yields poorly; stools are weakened and inadvertently pulled out at harvest. The damage from canegrubs reduces the ability of cane to produce subsequent crops (ratoons). Hence damage in one year can affect not only the yield in that year, but also the yield of ratoon crops in succeeding years [1]. Damaged plants have yellowed and wilting leaves. Plant death occurs in severe cases.

Since the late 1940s, control of canegrubs in Australian sugarcane has depended heavily on synthetic insecticides. Prior to the use of insecticides, cane grubs damaged thousands of hectares of sugarcane causing losses in the hundreds of millions of dollars each year [1]. Early control measures included hand collection of beetles and larvae, ploughing, light trapping of beetles, fumigation of the soil, and importation of predators and parasites. None of these methods was particularly effective [1]. Despite the collection and destruction of up to 34 tonnes of beetles each year in the 1930s, canegrubs remained a pest of sugarcane. Large areas of feeding trees were removed in the 1930s, but thousands of acres of sugarcane were still damaged by cane grubs [1].

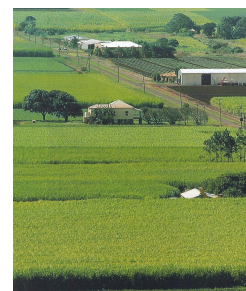
Insecticidal control of cane grubs has followed three strategies. Starting in 1947, organochlorine insecticides were applied — one treatment gave three years of control. Organochlorine insecticides were withdrawn from use in 1987. For the past twenty-five years, chemical control of canegrubs has been achieved through the application of a controlled-release organophosphate insecticide providing 2-3 years of control when applied at planting. Research has typically shown a yield increase of up to 20% in the first ratoon cane crop as a result of the controlled-release application [2]. The economic return to growers considering the cost of treatment is approximately 10:1 [2]. Recently, a chloronicotinyl compound has been developed that can be applied to the ratoon crops, extending insecticidal control by 2-3 years and increasing ratoon crop yields by 20-100% [3]. Without insecticidal control of cane grubs, an estimated 12% of the total production of Australia's sugarcane crop would be lost [1].

### References

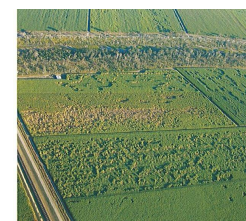
1. Robertson, L.N., P.G. Allsopp, K.J. Chandler and R.T. Mullins. 1995. Integrated management of cane grubs in Australia: current situation and future research directions. *Australian Journal of Agricultural Research*. 46:1-16.
2. Allsopp, P.G., N.G. McGill and J.K. Stringer. 1996. Control of Childers canegrub (*Antitrogus parvulus* Britton) in Australian sugarcane with a controlled-release formulation of chlorpyrifos (suSCon® Blue) and the effects of infestations on yield. *Crop Protection*. 15(6):505-511.
3. McGill, N.G., G.S. Bade, R.A. Vitelli and P.G. Allsopp. 2003. Imidacloprid can reduce the impact of the whitegrub *Antitrogus parvulus* on Australian sugarcane. *Crop Protection*. 22: 1169-1176.



Greyback grub



Australian sugarcane crops



Greyback grub damage



Insecticide applicator