

Editors comment: This is the fourth of a series of articles on insect pests that afflict fruit growers in China. This one has been in Australia for more than 100 years but it is definitely an Oriental and most definitely a beast.

Beasts of the Orient!!!

Codling moth *Cydia pomonella*

Apples and pears are native to the foothills of what the Chinese call the Tian Shan – the mountains of heaven – we know them better as the northern slopes of the Himalayas. Forests of wild apples occur in far western China and Kazakhstan near the old silk road. This is where both apples and pears come from and also where codling moth started on its world wide journey.



Inland foothills of the Himalayas in Kazakhstan – home of apples, pears and codling moth.

Pears have been cultivated for more than 3000 years in China and five species are grown commercially. The 'normal' pear in China is something like a nashi but the other kinds are easy to find. Although it originated in the same place as the other pear species, European pear is rare in China. Apples have been grown in China for about as long as pears but until recent years did not have the same level of prominence or diversity as that achieved by pears.



codling moth infested fruit



Codling moth, another beast from the Orient that came along with apples and pears crops originally from western China and Kazakhstan

Pest status of codling moth in China

More than 60% of the apple production in China is in five eastern provinces where codling moth does not yet occur. A similar situation pertains to with pears - Hebei near Beijing is the biggest pear growing province. However, codling

moth is a serious pest in the western provinces of Xinjiang and Gansu and the northern provinces of Inner Mongolia, Heilongjiang and Jilin. It is now moving into the important northern province of Liaoning and there is concern that it will establish in Shaanxi, the biggest apple growing province in China. A total of 438,000 hectares of apples and 120,000 hectares of pears are grown in the current codling moth areas. Where it occurs, it is every bit as bad as in Australia. In hot areas like Gansu, codling moth can go through three generations in a season, as it can in the Goulburn Valley in Victoria. In cold areas like Heilongjiang (up against Siberia), codling moth has only one generation season.



Map of the provinces of China.

Movement of apples and pears from the western China to the eastern provinces is not restricted and codling moth will continue to spread in China.

Control of codling moth in China

For several decades in China, the preferred method for protection of fruit from codling moth has been bagging individual fruit. This is labour intensive and expensive. Apple and pear production in China is adopting western methods. Farms are amalgamating and yields per hectare are increasing. At the same time, labour is becoming scarce and more expensive in rural areas. Bagging fruit is on the way out. Insecticides were used haphazardly a little over a decade ago but are now tightly regulated. Organophosphate sprays like azinphos methyl and parathion are banned. This is a good thing for the safety of Chinese farmers and consumers but it limits the options available for management of codling moth, Synthetic pyrethroids and neonicotinoids are now widely used.

New developments in control of codling moth.

Work done at Michigan State University and at DEPI in Victoria has provided leads which have allowed Sinogreen to develop a better pheromone dispenser for mating disruption of codling moth. This has recently been registered in Australia.

Research into female codling moth attractants has also made great strides in Australia, New Zealand and USA in recent years and we can expect 'attract and kill' products targeting females moths in a few years time. This will supplement current mating disruption technology where populations of the pest are high.

About the author

Stephen Sexton is an Australian entomologist and agricultural scientist now based in Nanjing in China. He is the principal scientist of a Chinese company Sinogreen which specializes in development of products based on insect behavior modifying chemicals – like pheromones and host plant volatiles. He founded Biocontrol and Pacific Biocontrol and pioneered commercialization of pheromone mating disruption technology with the Isomate range of products. Stephen and his wife Hilary now live most of the year in Nanjing.