The threat of the European Corn Borer to forage maize

Jonathon Harrington
NFU Cymru Crops Group

Cardiff University Lecturer and NFU Cymru Crops Group member **Jonathon Harrington** provides maize growers with a warning of the threat of the European Corn Borer. This article is adapted from a paper Jonathon has co-written with **Eric Gussin** of Optima Excel

When I first went to Harper-Adams Agricultural College in the 1970s the growing of forage maize in the UK was in its infancy although the then vice principal was a keen advocate of its potential as a source of forage for livestock.

Since then forage maize (Zea mays), has become an important crop for providing winter feed for cattle in the UK. The breeding of new varieties which can grow well in more northern latitudes, the absence to date of any major insect pests and the availability of cost-effective selective herbicides have all contributed to the crop's increased popularity. In 2017 the area of forage maize grown in the UK was almost 200,000 hectares of which 12,000 hectares was grown in Wales.

Maize is one of the world's most widely grown crops and is often associated with one of its major insect pests, the European Corn Borer (Ostrinia nubilalis). This pest is of major economic importance in many parts of the world. It is native to western Asia and Europe and was most likely introduced to the United States in the 20th Century where it has become a major problem. Prior to the widespread planting of Bt maize in the US, this insect was estimated to cost growers $1 billion annually in yield and quality losses plus control costs. Equally, losses in Europe can be significant. In Germany, the yield losses due to Corn Borer in testcross hybrids amounted to 40%.

As well as maize, other economically important crops can act as hosts; these include potatoes, oats, tomatoes, beans and celery amongst others.

With increased mean European temperatures and in particular warmer winters in the UK over the last decade, reports of this insect pest in southern Britain have increased considerably. First reports started in the south west in 2011 and had spread as far as Kent and the M4 corridor by 2017.

In my view it may now be considered as a potential threat to maize crops in South Wales.

European Corn Borers will feed on and injure almost any part of the maize plant except the roots. The larvae of the Corn Borer cause direct losses by boring into plant stems and ears in addition to indirect losses by facilitating the infection by micro-organisms such as Fusarium species.

Left - The European Corn Borer in larva form
Right - A clutch of European Corn Borer eggs on a leaf

Measurement of total losses cannot satisfactorily be made purely by measuring yields since pests typically attack the more valuable parts of plants, thereby reducing the feed value. A yield reduction of 20% for example, could be compounded by a reduced value of the remaining 80% due to reduced quality. Thus, a relatively minor pest population could have a disproportionate effect on the value of any individual crop.

The major impact to the maize plant is loss of nutrient and water transfer to the grain, due to the tunneling or boring damage caused by the larvae in the stem. The tunneling may also cause the tassels to drop before harvest, stems to snap, and allow secondary pathogens to attack the plant. As stems are weakened, the risk of lodging increases which adds potentially further losses.

There appears to be little if any reliable data on levels of damage and economic impact in the UK but in the USA, it is estimated that the total annual cost (control costs and yield losses) due to the Corn Borer have exceeded $1 billion. In Europe, average yield losses of around 8% have been reported, but the damage varies from year to year with some reports of yield losses as high as 40% in Germany. Although the Corn Borer has been reported in The Netherlands there is no data currently regarding its economic impact.

Good stubble hygiene is the key approach to control the spread of the moths and is the basis of any integrated control program. Destruction of stems and the overwintering sites of larvae has long been recognised as an important element of Corn Borer management. Destroying crop harvest residues, if possible, by ploughing, significantly reduces the number of surviving larvae. Where the Corn Borer is a particular problem, chemical control using liquid formulations of insecticide are commonly applied to protect against damage by the Corn Borer, particularly from early tassel formation until the corn silks are dry.

The adverse effects of the Corn Borer are likely to become more acute as temperatures rise and cropping intensifies. Welsh agriculture would be well advised to anticipate the problems that it will cause and take steps to reduce these well in advance.

To read the paper in full please visit www.optimaexcel.co.uk.

NFU Cymru is hosting an online form on behalf of Optima Excel seeking to gather evidence of the existence of the European Corn Borer in Welsh maize crops. Welsh farmers who spot the pest in their maize crop are encouraged to provide their postcode and acreage on the online form at www.nfu-cymru.org.uk/crops.
By providing their acreage and postcode, members agree for that information to be used for research purposes.