

# Western corn rootworm is a highly invasive species of great economic importance

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**The Western corn rootworm (*Diabrotica virgifera virgifera* Leconte)** is widespread in Europe – Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, France, Germany, Greece, Hungary, Italy, Montenegro, Poland, Romania, Russia, Slovakia, Slovenia and Ukraine. It is considered to originate from Central America. In the twentieth century the species was a major pest of maize in North America. Its cultivation as a monoculture over the years has led to the expansion of the pest's range and it has left the borders of the USA through international trade.

The Western corn rootworm has accidentally entered Europe several times from North America in the period 1980-2000. The species became invasive and rapidly spread in Central Europe during the 1990s and the

beginning of the 2000s. For the first time *D. virgifera virgifera* was detected in July 1992 in the Surčin area (Serbia), near the international airport in Belgrade.

Once it entered Europe, the pest began to spread rapidly in the Danube region. In Bulgaria it was established in 1998 in the northwestern and central northern parts of the country. Each year, phytosanitary authorities have carried out monitoring of the pest throughout the country through visual observations and the placement of sticky traps with pheromone and synthetic food attractants.

In 2003, intensive training of producers began, introducing them to the pest, the risks of its population increase and the control methods; trials were conducted to test resistant French and Bulgarian maize and sorghum hybrids and varieties.

In 2007, a programme was introduced to contain the further spread of *Diabrotica virgifera virgifera*, in line with the programmes of the EU Member States. Despite the efforts, its distribution covers almost all maize production regions in the country. Population increase of the pest has been established in small areas with maize grown as a monoculture in the northwestern region.

***The economic impact of the occurrence of the pest for our country is relatively low.*** In 2015, by Decision of the EU, the monitoring was terminated.

### **Hosts**

The main host of *Diabrotica virgifera virgifera* is maize (*Zea mays*). Adults are oligophagous – they feed not only on maize, but also on secondary host species – cereal, legume and cucurbit crops. The larva is monophagous, feeding only on maize roots, which it gnaws and tunnels.

### **Biology and morphology**

In Bulgaria, maize is of great importance as a crop in many production regions. The favourable climate facilitates the spread and development of the pest. Beetles appear at the end of June and can be observed until mid-October; they immediately begin to feed and mate. Larvae can be found from the beginning of May until the end of August. The pest overwinters in the egg stage in areas around maize fields. It has one to two generations per year, and damage is caused by both adults and larvae. Adults are yellow in colour with black stripes along the elytra, and their size reaches 0.7 cm. Larvae are whitish with a dark head. They can be found in the soil at a depth of up to 35 cm, but most often inhabit the layer down to 15 cm depth.

## ***Symptoms***

Newly emerged larvae feed mainly on root hairs. Subsequently, they bore into the roots and tunnel them towards the base of the plant, which leads to the occurrence of root rot and suppressed growth and development of the plants. Larvae can be found near the base of the growing point – a groove is observed and later the plant lodges. Adult beetles cause damage by feeding mainly on pollen, tassels and young kernels.

## ***Dispersal and control***

Although larvae move over relatively short distances, adults fly to maize fields and migrate several kilometres per year. To track the spread, yellow sticky traps and pheromone traps are successfully applied. The most suitable period for their placement is the beginning of June. Crop rotation is an effective control method, and the mandatory rotation period is at least three years.