Japanese beetle (*Popillia japonica*)

Introduction

The Japanese beetle (*Popillia japonica*) is native to Japan and has been introduced the neighbouring Kunashir island, Russia. In 1911, it was accidentally introduced to North America, where it spread and became invasive in most of eastern North America, as well as parts of Canada. In 1970 the beetle arrived in the Azores islands, Portugal, but it was not until 2014 that it was first found in mainland Europe, in Italy, and subsequently spread to Switzerland in 2017 [see distribution].

Adult beetles are known as defoliators, but they can also feed on fruits. In Japan, the damage caused by this beetle on plants is not severe, however, in North America it is considered a major pest, affecting many crops and fruit trees, as well as ornamental and environmentally important plants. The larvae live underground feeding mainly on plant roots and are pests of lawn and turf.

Adult beetles are very active and move within and between plants. They can also fly more than 4 km, but they need warm temperatures (optimum temperature ranges between 29-35°C) to take flight. The beetles can disperse over long distances as larvae or adults in plant trade and adults can also hitchhike in non-host commodities or vehicles.

Host

Adult Japanese beetle is highly polyphagous, with over 700 plant species recorded as hosts, from 79 different families. In North America, they cause damage to important crops such as maize, soybean, and pasture. They also cause defoliation on apple, birch, lime and rose.

Some of the tree and shrub hosts include: *Acer* (maples), *Betula* (birch), *Fagus* (beech), *Larix decidua* (larch), *Malus* (apples), *Populus* (poplars), *Prunus* (stone fruit), *Quercus* (oak), *Tilia* (limes), *Ulmus* (elms), *Althaea rosea* (hollyhock), *Rhododendron*, *Rosa* (roses), *Rubus idaeus* (raspberry), *Vaccinium* (blueberry), *Viburnum* and *Vitis* (grapevine).
Other hosts of economic importance are: *Asparagus officinalis*, *Fragaria* (strawberry), *Trifolium* (clover) and *Zea mays* (maize).

Biology

Japanese beetle females can lay up to 60 eggs in soil cavities, usually preferring healthy and vigorous grass. Larvae, known as grubs, start to hatch in the middle of July, and feed on fine roots and organic matter. In late autumn, larvae stop feeding and remain inactive through the winter at around 5-10 cm depth in the soil. In early spring, after the grubs feed for a few weeks, pupation occurs. Adults[CM1] emerge from the pupae and the soil in the beginning of the summer (late June in the northern hemisphere) and begin to feed on low-lying plants. Later on, adults move to tree foliage, where they continue to feed, and mate. Between July and early September, female adults return to the grass to lay eggs masses in the soil.

In warmer climates, Japanese beetles have one generation per year, but in areas where temperatures are lower, the life cycle can take up to two years to complete.

Symptoms

For details of the symptoms, scan or click on the QR code to access the accompanying poster.

More information

- IPM Popillia: https://www.popillia.eu/
- EPPO Global Database: https://gd.eppo.int/taxon/POPIJA
- DEFRA: https://planthealthportal.defra.gov.uk/assets/factsheets/popillia-japonica-factsheet.pdf
- UK Plant Health Risk Register: https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/viewPestRisks.cfm?cslref=6296
- EFSA journal: https://doi.org/10.2903/j.efsa.2018.5438

Acknowledgements
This factsheet was written by by Itxaso Quintana, BGCI, May 2024.