If New Zealand flatworm is already established in your garden then a recommended method for minimising their impact is to increase the number of refuges i.e. stones, bricks, logs, weighted-down polythene bags lying on the soil surface and eliminate all New Zealand flatworms found under them. This strategy relies on a regular, sustained campaign of searching for and disposing of flatworms (see below). Please note if in doubt as to whether or not the flatworms are native species, please consult the appropriate authorities listed below.

There are no approved chemical control methods for New Zealand flatworms. However, individual flatworms can be disposed of by dropping into hot (>30°C) water, or by sprinkling with salt, or by squashing. New Zealand flatworms are covered with sticky mucus which can cause skin irritations. Therefore, it is recommended that you do not touch them. If necessary handle wearing rubber gloves.

Any conditions which make your soil more suitable for earthworms will help tip the balance in their favour. For example, incorporate organic matter into the soil to benefit earthworm populations.

Large predatory beetles, particularly larval and adult 'rove' (Staphylinidae) and 'ground' (Carabidae) beetles may devour New Zealand flatworms. Although, unlikely to be totally effective biological control agents, the presence of these beetles is to be encouraged, for example by minimising the application of insecticide sprays and providing 'beetle banks' (uncut grass margins).

If you suspect the presence of a New Zealand flatworm in your garden, specimens can be sent for identification to the following addresses

England Mr M Lole
Lily Wood Barn, Rushbury nr Church Stretton
Shropshire SY6 7EA

Scotland Dr B Boag, The James Hutton Institute, Invergowrie, Dundee, DD2 5DA
Tel: 0844 928 5428 • Fax: 0844 928 5429
info@hutton.ac.uk

Northern Ireland Dr Archie Murchie,
AFBI, Newforge Lane, Belfast, BT9 5PX
Tel: 02890 255324/5305 • Fax: 02890 255003

The New Zealand flatworm (Arthurdendyus triangulatus) is a predator of earthworms which was first discovered in the UK in 1963. Since then it has gradually spread, mainly in central and southern Scotland, northern England and Northern Ireland. It is predominantly found in gardens, where it can reduce resident earthworm populations and potentially, over time, harm the soil structure.
**Know the neighbourhood**

Once the New Zealand flatworm has invaded a local habitat it can be very difficult, if not impossible, to eliminate particularly as the population is unlikely to be limited to just one garden. However, there are a number of practical measures which you can take to reduce flatworm populations and restrict their spread. As flatworms are highly mobile, measures will be most effective when applied to all gardens within a neighbourhood.

**Identification**

**Mature New Zealand flatworms** have a purple-brown upper surface, buff-coloured margins and underside. They are usually about 1 cm wide and 5 to 10 cm long, with a smooth, sticky skin. Their characteristic resting shape is a flattened spiral.

**New Zealand flatworm egg capsules** resemble shiny blackcurrants and are commonly found during early summer and late autumn.

They vary in size, between 4 to 11 mm long and 3 to 8 mm wide. Juvenile New Zealand flatworms emerge after about a month and are creamy white, or yellow in colour.

**Recommended measures to prevent introduction and establishment in your garden**

**Be vigilant**

Check all new plants you bring into your garden, especially those obtained privately, to ensure that no flatworms or egg capsules are present. Removal of excess soil from the plants or heat treatment (see over) should prevent accidental introduction. Any soil which has been removed should be disposed of in a manner to prevent possible contamination (e.g. in sealed bags).

**Avoid creating piles of plant cuttings, leaves and soil** as these are ideal refuges for New Zealand flatworms. Compost heaps are not a problem as long as they are active, i.e. warm, or they are bounded in such a way as to prevent the inward and outward movement of flatworms (e.g. keep out of direct contact with the soil surface).

**Stones, bricks or logs used as borders or paths, provide suitable microhabitats** (daytime shelters) for New Zealand flatworms. Reducing the availability of such microhabitats will limit the number of refuges available to the New Zealand flatworm population and thus lessen the likelihood of it becoming established in your garden. Early checks under daytime shelters may give an early warning of their presence.

**If the New Zealand flatworm is already in your garden**

Do not move plants and soil unnecessarily. Infested, or suspect, potted plants can be treated by:

- removal of the soil from the root ball and re-potting in 'sterile' pots and growing media
- or
- immersing the pot and root ball in warm (>30°C) water for 40 minutes
- or
- placing the plants in a warm environment, e.g. at 30°C for 12 hours.

The latter two treatments will result in the death of New Zealand flatworms. However, if egg capsules are present, or suspected, it will be necessary to repeat these procedures after 14 days, so that any hatchlings are destroyed.