New Zealand Flatworm, *Arthurdendyus triangulatus*

**Overview**

*Short description of Arthurdendyus triangulatus, New Zealand Flatworm*

Flat (with a more or less pronounced median dorsal ridge), covered in sticky mucus, pointed at both ends, up to 17 cm long when elongated but shape can vary considerably. Upper surface dark brown with a lighter margin, underside also lighter with small dark specks. It has no annules.

*Description of Arthurdendyus triangulatus, New Zealand Flatworm status in GB*

The New Zealand flatworm has a widespread distribution and is relatively common in Scotland and Northern Ireland.

**Habitat summary: Arthurdendyus triangulatus, New Zealand Flatworm**

Most records are from domestic gardens, some still come from garden centres and nurseries with relatively few from farmland.

The New Zealand flatworm requires damp, cool conditions to survive i.e. it cannot live in dry soils or where the temperature is below 0 or above c. 20 degrees Celsius. Its distribution in GB is probably limited to areas which have earthworms (soils with pH levels above 4). The New Zealand flatworm is nocturnal and probably feeds on the earthworm species which come to the soil surface at night to feed. During the day it takes refuge under stones, pieces of wood and piece of polythene. It itself does not seem to have the ability to make burrows but when conditions are unfavourable it relies on earthworm tunnels, dead root channels or cracks in the soil surface to access the deeper soil horizons where it is cool and damp.

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**Invasion history: Arthurdendyus triangulatus, New Zealand Flatworm**

**Origin**

It originated from New Zealand where it is associated with native woodland in the Canterbury area but also found throughout the South Island in nurseries and garden centres.

**First Record**

It was noted in Edinburgh botanic Gardens in the 1950s and the first published record was in Northern Ireland in 1963. In 1990 it was first found under field conditions where it reduced earthworm numbers to below detectable levels.

It was possibly introduced into GB in the 1950s probably is soil associated with plants brought to Britain. In Scotland it was first recorded from Edinburgh Botanic Garden. It is likely it was then spread in soil around the roots of containerised plants to nurseries, and garden centres then into domestic gardens. The importance of garden centres and nurseries has probably diminished and most of the spread to domestic
The spread to farmland is occurring mainly in the west of Scotland and has occurred in Northern Ireland where over 70% of farms are infested. The spread between fields and farms may be associated with the movement of hay and silage bales. Field observations of the New Zealand flatworm in the west of Scotland have shown it can travel at 1 metre/day.

**Pathway and Method**

Containerised plants collected for Edinburgh Botanic Gardens from New Zealand and possibly initially taken to their Benmore Garden site near Dunoon could be the initial source of infestation. However commercial traffic in containerised plants exported from New Zealand from infested nurseries is possible e.g. rhododendrons from a garden centre on the Banks Peninsula, South island New Zealand.

**Species Status**

A survey of the New Zealand flatworm in Scotland showed that between 1965 and 1980 it was mainly recorded from garden centres and nurseries around Glasgow and Edinburgh. However by the 1990s it was mainly found in domestic gardens throughout Scotland including some of the Scottish Islands with some records from farmland. A similar picture occurred in Northern Ireland but there surveys of farmland in 1991 and 19981999 found 3% and 65% respectively of farms infested. Although the first record of the flatworm in England was in 1965 it was not until 1992 that it was again found and the rate of spread in England has been much slower than in Scotland or Northern Ireland. The New Zealand flatworm has also been recorded from the Faroe Islands in 1992 but never yet from continental Europe or from any other part of the world even though climatic conditions would probably allow its establishment.

**Ecology & Habitat: Arthurdendyus triangulatus, New Zealand Flatworm**

**Dispersal Mechanisms**

The dispersal of the New Zealand flatworm is mainly dependent upon movement of contaminated soil probably with containerised plants.

It has occasionally been recorded from kick samples in streams and hence rivers might also spread it and there are reports of it being attached to the fur of cats when they return from being out hunting at night so animals might also occasionally spread it.

**Reproduction**

The New Zealand is hermaphrodite and produces an egg capsule (usually containing 6-7 young) probably every 7-10 days in late spring and summer. The egg capsule (usually 10-15% of the adult flatworms weight) can be white to cherry red and is extruded either through the reproductive opening on the ventral surface or through a slit opening up on the dorsal surface. This immediately heals up and leaves a small white scar. The young hatchlings initially are a creamy white but soon turn to the same colour as the adults.

**Known Predators/Herbivores**

The only known invertebrate predator are ground beetles but their numbers are probably too small to have an impact on New Zealand flatworm populations. Ducks and geese are known to feed on them and there are records of robins, blackbirds and ferrets consuming them.

**Resistant Stages**

The New Zealand flatworm reproduces by producing an egg capsule (which on average contains 6-7 small creamy coloured hatchlings) and is whitecherry red and soft when expelled. This hardens and becomes shiny and black and probably more resistant than the adults to dessication.

**Habitat Occupied in GB**

In damp cool areas of GB, usually on the soil surface. During the day it is usually found under stones, pieces of wood or polythene lying on the soil surface which act as refugia. It is assumed that at night they normally hunt earthworms on the soil surface. In dry conditions they can be found deeper in soil (via old root channels, earthworm burrows or cracks).

**Distribution: Arthurdendyus triangulatus, New Zealand Flatworm**

It is well established in Northern Ireland and the west coast of Scotland and all major Scottish islands.

**Impacts: Arthurdendyus triangulatus, New Zealand Flatworm**

**Environmental Impact**
The large anecic earthworm species, *Lumbricus terrestris* and *Aporrectodea longa* which aid drainage and are a source of food for animals and birds, are affected by the New Zealand Flatworm. Additionally a survey of 59 fields in western Scotland found that where the flatworm had been established its presence was strongly associated with the eradication of moles.

**Health and Social Impact**

People with sensitive skin have reported a reaction when they have come in contact with the mucus on the surface of the New Zealand flatworm and for this reason it is suggested that gloves be worn.

**Economic Impact**

There is likely to be considerable economic impact if this species becomes widespread in agricultural land because of the reduction in earthworms populations which might lead to lower grass yields. The detrimental impact on other crops and to poor drainage and to the yield of other crops has not been estimated.

**References & Links: Arthurdendyus triangulatus, New Zealand Flatworm**

**Identification**


**Biology, ecology, spread, vectors**


**Management and impact**


**General**