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Obama nungara in a garden in France. Photo by Pierre Gros, CC BY

Obama nungara: How a flatworm from Argentina jumped the Atlantic and invaded France

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An unfortunate consequence of globalisation is the introduction of exotic species into countries where they are not native. In some cases, such species can proliferate and become invasive. In France, the most noted invasions in recent years have been the devil bug and the Asian hornet.

While nonnative insects are quickly spotted because they fly during the day, less visible are invasive flatworms, also known as land planarians. They're generally nocturnal, soil-dwelling creatures, and their presence is often discovered only when they're well established in their host country.

In the UK, the New Zealand flatworm, *Arthurdendyus triangulatus*, has invaded England, Scotland and Northern Ireland, and is highly abundant. This species is the only land planarian officially declared to be invasive as invasive by the European Union. In the United States, hammerhead flatworms are common in the south and even in the north, with a first report in Canada. In addition, the infamous New Guinea flatworm, *Platydemus manokwari* – the only one listed in the “100 world's worst invasive alien species” – is now rapidly colonising Florida. In Australia, many native flatworms are common, but the New Guinea flatworm is also an invader.

Several species of land planarians have invaded France and Europe in recent decades. The most spectacular are the bipaliines, or “hammerhead worms”, which can reach 1 metre in length. In France, they mainly occur in the southernmost departments. However, other species of

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Langues

- English
- Français

invasive terrestrial flatworms possibly pose a greater threat to the soil fauna.



Citizen science: photographs of *Obama nungara* sent by non-professionals from many places in France. Various authors, layout by Jean-Lou Justine

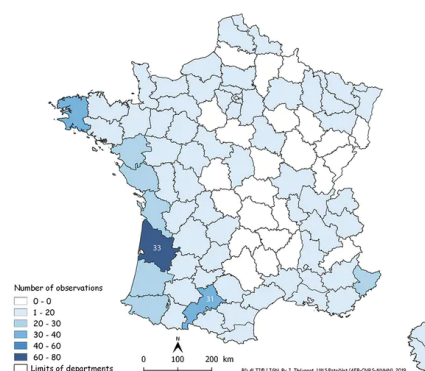
More than 1,000 reports of land flatworms in France

Our team has just published the results of seven years of work on the occurrence of land flatworms in France, based on participatory science. Scientists cannot visit every garden, but citizens have made an extraordinary contribution by sending more than 1,000 reports. Of these, the most striking result is that more than half of these reports, 530 exactly, concerned only one species of terrestrial flatworm.

This most abundant species is the land planarian *Obama nungara*. At the start of our study, it had no name... because it had never been described by scientists. In 2016, researchers from Brazil, Spain and the United Kingdom gave it its full name, *Obama nungara*. The name of the genus, *Obama*, had been created a few years earlier based on two words of Brazil's Tupi language: *oba* – leaf, and *ma* – animal, alluding to the flattened leaf-like form of the animal. (That the genus shares the name of a former US president is pure coincidence.)

Where can *Obama nungara* be found in France? Unfortunately, the simple answer is almost everywhere. The species is present in three-quarters of the French departments. We now have precise maps of the present distribution of the flatworm thanks to the numerous reports from citizen scientists. The most affected departments are those of the Atlantic border, while *Obama nungara* is less abundant in the northeast quarter of France and the mountainous regions. Why? Probably because land planarians do not flourish in climatic extremes – dry hot summers and freezing cold winters – whereas the mild, moist maritime climate of the country's Atlantic coast suits them perfectly.

The species was first found in Brazil, and initially scientists thought that this was its country of origin. Researchers then turned to more sophisticated methods, using



A map of France showing departments invaded by *Obama nungara*. Jessica Thévenot

molecular markers – the famous “barcode” – to determine its geographic origin. From the results of these analyses, the population that has invaded France and the other countries of Europe was found to come from Argentina, not from Brazil. In fact, the population of *Obama nungara* in Brazil has not left this country.

How did *Obama nungara* get from Argentina to Europe?

Land flatworms are rather fragile, soft-bodied soil animals with very limited mobility. However, humans have given them a great way to travel all over the planet – together with the soil in potted plants. Most likely, some *Obama nungara* travelled as stowaways in soil from a commercial nursery in Argentina, and subsequently carried by ship to a port in Europe. It reminds us of the famous Argentine ant, which invaded the Mediterranean regions of Europe only a few decades ago.

À lire aussi : Yes, giant predatory worms really are invading France

The species is now well established in several countries, such as Spain, Portugal, Italy, Belgium, and the United Kingdom. Only in France has a detailed study of the distribution of the species been made. How did this animal that has limited mobility disperse to all these countries? Again, via the international commercial plant trade exporting potted plants to garden centres in various countries.

Commercial garden centres and nurseries provide an ideal mechanism for *Obama nungara* to be inadvertently dispersed by garden enthusiasts when they unknowingly purchase potted plants containing egg cocoons or mature specimens of the land planarian. Once in an urban garden, the animal can thrive and proliferate, and over time can move into neighbouring gardens or adjoining farmland.



Proliferation of *Obama nungara* in a garden. by Sylvain Petiet

Why did *Obama nungara* proliferate?

Scientists have a general rule for invasions: if species are moved to a new environment, 1 in 10 succeeds in establishing itself. Among those that do, only 1 in 10 will proliferate exponentially, often because it has no natural predators in its new country. *Obama nungara* is among the latter group and is therefore an invasive alien species (IAS). Being small, brown and mainly nocturnal, the species is unobtrusive and readily overlooked. It reproduces very quickly and makes “cocoon” – which are small, hardy black balls that are even more difficult to see – and each cocoon contains up to several embryos.

Importantly, *Obama nungara* has no natural enemies in Europe. While these soft-bodied terrestrial flatworms may seem to be fragile, they are protected by secretions containing a sophisticated chemical arsenal that generally makes them repugnant to potential predators such as birds.



Adult *Obama nungara* and its cocoon, which is reddish at first then turns black. by Pierre Gros

Like other land planarians, *Obama nungara* is a top-level predator, and eats soil-dwelling animals such as earthworms and snails. Soil is a complex environment, with hundreds of species interacting. With *Obama nungara*, humans have inadvertently introduced a wolf into the flock of sheep. It is voracious and reproduces rapidly, and can swiftly increase in numbers.

Do we know what the impact of *Obama nungara* is in our gardens? Not yet. How many, and which prey species does an *Obama nungara* eat? We presently know very little. What we do know, however, is that the species is proliferating and therefore most certainly consumes a lot of soil animals. Counts have allowed us to estimate the production of individuals, per reproduction, at 1,000 worms per hectare per day... at the end of the year, even allowing for natural mortality in the flatworm populations, a lot of land planarians survive to eat other soil animals.

What can we do?

Overseas experiences suggest that checking imported plants for the presence of land flatworms at the port of entry and in distribution centres is at present difficult, impracticable and costly, and so they have not been widely adopted. Unfortunately, there is little that can be done to limit the spread of such species once they have been established. Invasive land flatworms may take a decade or more before they become so numerous and widespread that they are noticed, by which time it is too late to adequately control them. Furthermore, there are no chemicals approved or authorised for combating them, and manually collecting and killing them found in gardens seems to be ineffective.

Scientists will continue to map the distribution of the flatworm, and the help of citizen scientists with this task is crucial. To better assess the ecological impact of *Obama nungara*, we will now try to determine the full spectrum of prey it consumes.



Obama nungara killing and eating an earthworm. by Pierre Gros

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📌 Soil Europe Invasive species France South America Argentina Worms Citizen science The Conversation France

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