



**Australian Government**

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**Department of Agriculture,  
Water and the Environment**

## **Department Risk Analysis**

**Application to add *Cornu aspersum* (common garden snail) to the  
Environment Protection and Biodiversity Conservation Act 1999 *List  
of Specimens taken to be Suitable for Live Import***

June 2020

# INTRODUCTION

## ***Purpose of the proposed import***

Two organisations, Snails Pace Australia (based in Western Australia) and La Perouse Escargot (based in Tasmania) have applied to add the common garden snail (*Cornu aspersum*) to the Live Import List for commercial food production purposes. Both applicants suggest that there is significant interest in the restaurant industry in obtaining high quality escargot for human consumption in Australia and abroad and wish to develop heliculture businesses farming the common garden snail. The animals will be sourced from overseas producers of edible snails that are eligible to export animals from commercially bred populations to Australia.

## ***Background***

Under s303EC of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the responsible Minister may amend the *List of Specimens taken to be suitable for live import* (Live Import List) by including a specimen on the list. There are two parts to the List:

1. Part 1 comprises specimens that can be imported without a permit under the EPBC Act and
2. Part 2 comprises specimens that require a permit under the EPBC Act to be imported. Import restrictions generally apply to the species listed on Part 2, such as 'Eligible non-commercial purpose only, excluding household pets'. Additional conditions may also be applied when the permit for import is issued.

Before amending the Live Import List, the Minister must consult with appropriate Ministers and other persons, and consider a report assessing the potential environmental impacts of the proposed amendment. When submitting an application to the Department to amend the Live Import List, all applicants are required to provide an accompanying report that addresses specific terms of reference.

The Department undertakes a risk assessment using the information in the applicant's report and any other sources of relevant information. The Department also considers comments and information received through the public consultation process (including states and territories).

The Snails Pace Australia application was received in December 2018 and the La Perouse Escargot application in July 2019.

The Snails Pace Australia application and accompanying draft report for the proposed import of common garden snail was released for public comment from 5 June to 18 July 2019. As the application from La Perouse Escargot had not been received prior to the commencement of public comment this has not been circulated for comment. The La Perouse Escargot application contained substantially the same information as the Snails Pace application. The second application was circulated for comment in the second consultation round.

# BIOLOGY AND ECOLOGY OF CORNU ASPERSUM

## ***Introduction***

The common garden snail *Cornu aspersum* (*C. aspersum*) is a native of western Europe where it has been collected and grown in captivity for food (escargot and snail caviar) for over 2000 years, and more recently its slime has been collected for use in beauty products. The species

has been accidentally and intentionally introduced through most of the developed world, including Australia, and is considered a pest throughout its current distribution due to the damage it causes to crops, orchards and gardens.

### **Taxonomy**

*Cornu aspersum* (Muller, 1774)

Family name: Helicidae

Genus name: Cornu

Species: *Cornu aspersum* (Muller, 1774)

Taxonomic Reference: Australian Biological Resources Study – Australian Faunal Directory. [https://biodiversity.org.au/afd/taxa/Cornu\\_aspersum](https://biodiversity.org.au/afd/taxa/Cornu_aspersum)

Common Names: Common garden snail, Brown garden snail, European brown garden snail.

Synonyms: *Helix Aspersa* (Muller, 1774); *Cantareus aspersea* (Muller, 1774); *Cantareus asperses* or *Cryptomphalus asperses*; *Cantareus aspersus* (GISD, 2020, UCIPM, 2017)

### **Description**

The adult shell of *C. aspersum* ranges from 25-40mm in diameter and 25-35mm high and is hard with four or five 'whorls' of varying colour and shade most commonly described as dark brown/yellow with flecks or streaks (CABI 2020). Adult weight averages eight to 12 grams with the preferred weight for commercial sale being 10 grams (Applicant's (Snails Pace) report).

The lifespan of *C. aspersum* is not well documented but thought to be between three and five years in the wild and up to 10 years in artificial facilities (CABI 2020).

The physiology of this species composes of a head, a foot and the visceral mass. The head contains two pairs of tentacles. The larger pair contains the eyes and the smaller pair is used to interact with the environment via touch. Below the tentacles is the mouth and the genital orifice is located on the right-hand side behind the head. The foot is used for locomotion and as a support for the weight of the shell. The 'filtrate' otherwise known as the snail's 'slime' protects the body and assists with locomotion. The visceral mass contains organs responsible for respiration, reproduction, digestion and the circulatory system.

*C. aspersum* can seal the opening to the shell with a membrane of dried mucous called an epiphragm. This allows the snail to hibernate in cold conditions and aestivate in dry conditions. The epiphragm helps the snail retain moisture and protects it from predation. *C. aspersum* can either hibernate or aestivate for several months until conditions improve.

*C. aspersum* can move up to 1.3 centimetres per second, or approximately 47 metres per hour. Additionally, the cost of locomotion (amount of energy needed to move) in gastropods such as *C. aspersum* is significant enough to be a limiting factor in dispersal by locomotion (CABI 2020). Due to this limitation *C. aspersum* is not known to move far from adequate food sources unless necessary.

However, *C. aspersum* may be transported significant distances via human activities such as the transport of nursery stock and other plant material. This species has also been introduced into many parts of the world intentionally for the production of snail meat (escargot) and snail caviar and by hobbyists who collect snails (CABI 2020, Dekle and Fasulo, 2011).

## **Diet**

*C. aspersum* possess rasping mouthparts called a radula. *C. aspersum* will feed on a large range of foods – preferring green living plant matter but will also eat vegetables, cereals, flowers, shrubs, dead animal tissue and paper products. *C. aspersum* have caused serious damage to vineyards and citrus groves (CABI, 2020). Feeding activity is essentially nocturnal and occurs only when the humidity of the surrounding environment is 80 percent or higher, such as at night or when raining (CABI, 2020). *C. aspersum* also shows a preference for plants rich in calcium such as stinging nettles and an avoidance of hyperaccumulator plants – those that are able to absorb into their tissues high concentrations of metals such as zinc and nickel from the soils where plants such as *Senecio coronatus*, a daisy from South Africa, are found (Boyd, 2002).

In Australia *C. aspersum* has not been recorded in native bushland even though it is widespread in human disturbed habitats. It has been found on the fringes where people have dumped their garden rubbish, or in places where human impact has occurred but not in native vegetation (Snails Pace report – Dr John Stansic pers comm). Whilst there is much evidence of destruction of agricultural plants, there is limited evidence in the literature that *C. aspersum* has impacted native ecosystems. In New Zealand it has been suggested the snail can alter native ecosystems through selective feeding resulting in plant community changes, their waste products increase fungal and bacterial loads resulting in changes to decomposition rates and the introduction and spreading of exotic snail parasites. (CABI, 2020)

## **Home range and social structure**

*C. aspersum* has no home range, den or nesting area but can be found in places where it can shelter from predators and unsuitable environmental conditions. During these times *C. aspersum* can be found under rocks, vegetation and other objects that provide them with shelter.

*C. aspersum* prefer areas that offer plentiful food sources. They are generally nocturnal unless conditions are conducive to diurnal feeding (such as during rainfall periods). However, snails cannot swim and will drown if fully immersed in water or exposed to very heavy rainfall and for this reason they are not generally found in or around waterways.

*C. aspersum* prefer to remain in groups near their food source but single animals may be found at times. On finishing hibernation, feeding and breeding are the priority for this species and so they will remain in an area populated with other snails for breeding purposes.

## **Reproduction**

Snails are hermaphrodites and have the male and the female genitals located in the one opening. In the wild *C. aspersum* will reach sexual maturity in two years. In captivity they may reach maturity in 10-12 months (CABI, 2020). Whilst *C. aspersum* individuals can self-fertilise, cross fertilisation occurs during mating which involves two snails giving and receiving sperm, having their eggs fertilised and then laying eggs.

Mature snails can mate two to six times per season if the conditions are favourable, namely high temperatures, high humidity and moist soil. *C. aspersum* will lay up to 130 eggs, usually two weeks after mating.

Eggs are round or oval shaped and 4.25 mm by 4 mm long (CABI, 2020) and are laid in a 4-10cm hole in the ground. Live young will begin to hatch after 18-35 days but do not hatch simultaneously and egg cannibalism is common.

### **Environmental tolerances**

*C. aspersum* is a generalist species, found in a large range of habitats and climates, from Mediterranean to temperate, oceanic and tropical. *C. aspersum* are ectothermic, relying on external sources of heat, and are only active when conditions are favourable. Activities such as feeding require temperatures between 7 and 28°C and humidity of between 75-90% (CABI, 2020). If conditions are not within these parameters adult snails are able to hibernate or aestivate for up to seven months, as they do in Scotland. In some Mediterranean areas they do not hibernate at all (CABI, 2020). *C. aspersum* cannot however withstand long cold periods particularly if these include frost. *C. aspersum* eggs are particularly sensitive to dehydration and cold so egg laying only occurs in spring and autumn in more temperate regions.

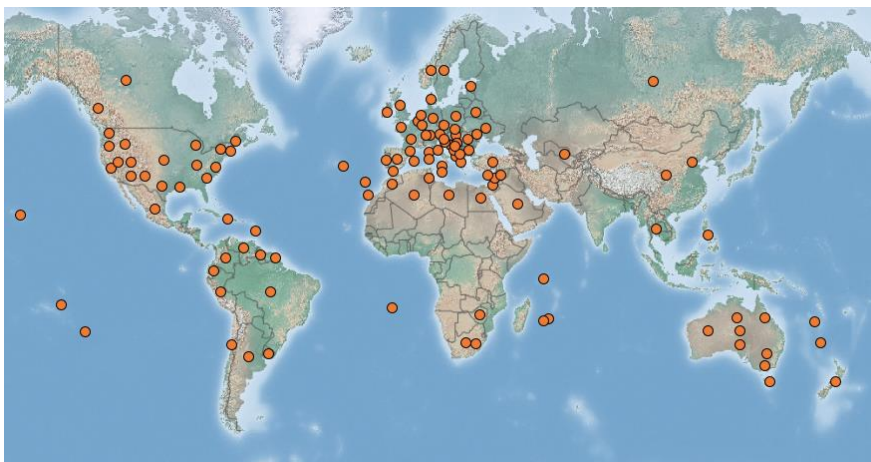
*C. aspersum* has shown a preference for microhabitats with high variability in both light intensity and structural complexity offering more places to aestivate/ hibernate and protection against predators. As the availability of calcium is critical for shell construction, richness in calcium is thought to be an important factor in habitat choice (CABI, 2020).

### **Distribution and endemism (as regards conservation status)**

#### **Range Description:**

*C. aspersum* is probably originally native to North Africa expanding into Europe and Western Asia and forming well-defined eastern and western lineages. The Western lineage is known to be the common ancestor of most forms of *C. aspersum* now found throughout Europe.

As an important food source live *C. aspersum* were transported throughout the world in the 1800's. Individuals may have also been translocated accidentally with plants and intentionally by snail collectors (CABI, 2020). *C. aspersum* has successfully colonized a large range of landscapes disturbed by humans and is considered an important agricultural pest where it has been introduced and naturalized (see **Map 1**, CABI, 2020).



**Map 1:** Distribution map from CABI (Centre for Agriculture and Bioscience International) 2020. *Cornu aspersum*.

### **Reason for import (captive breeding program etc.)**

Snails selected from the wild and bred in captivity are being used in Australia in small quantities for the restaurant trade however snail farmers struggle to provide enough snails that are of a consistent age, one to two years, and size, 10g being the ideal size for serving. In order to stock

commercial heliculture (snail farm) businesses large numbers of certified disease-free *C. aspersum* are required.

Heliculture farms in Europe have bred *C. aspersum* for eating for over 2000 years and have selectively bred snails for a consistent size and growth rate. Importing disease-free snails of the required age and size from a commercial snail farm ensures that the breeding of snails for restaurants can commence quickly and safely. The applicant (Snails Pace) states that a single 60kg shipment of adult snails (approximately 6,000 individuals) would be imported to begin breeding for future generations.

Importation of Garden Snails would be subject to an importation approval under the *Biosecurity Act 2015*.

## **Conservation status**

*Cornu aspersum* is not listed on any of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) appendices (CITES, 2020).

*C. aspersum* has not been considered by the International Union for the Conservation of Nature (IUCN) Red List (IUCN, 2020) as this species is broadly distributed throughout both its natural range and introduced ranges throughout the world. This species is considered as largely a commensal species with humans (Banks and Smith, 2015).

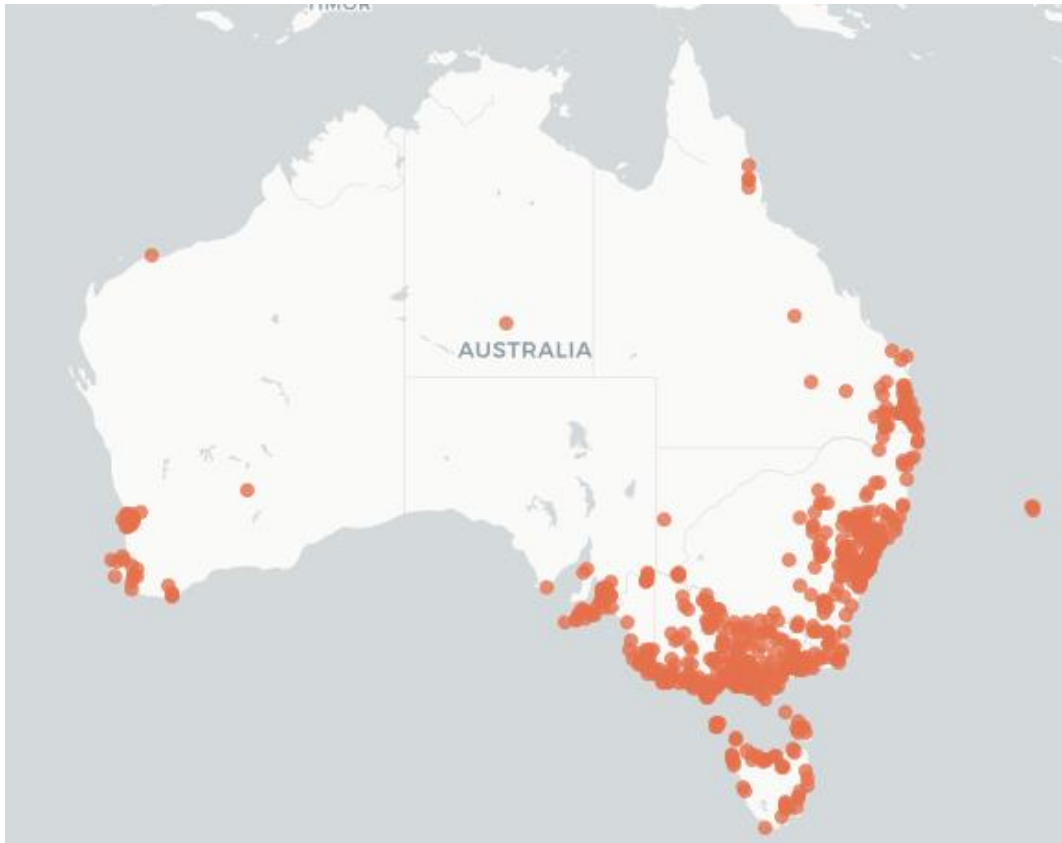
## **RISK ASSESSMENT**

Despite its broad distribution *C. aspersum* is not recorded in the literature as having any significant impact upon the Australian environment (CABI 2020, Banks and Smith 2015). However, it is unlikely that any impacts from the initial introduction of the snails were recorded.

As *C. aspersum* has been established in Australia for almost 150 years the focus of this risk assessment will be on increased risks occurring from the importation of new animals, including novel genetics, propagule pressure, pathogens and parasites which may change the impact *C. aspersum* is having on the Australian environment.

### ***Novel genetics***

*C. aspersum* is widely distributed throughout Australia with a higher prevalence in Victoria, NSW, ACT and Tasmania mainly in temperate, wet coastal areas (Map 2, ALA 2020). Smaller populations are also present in South Australia, Northern Territory, Western Australia and Queensland due to its ability to hibernate or aestivate when conditions are not favourable.



**Map 2:** *Cornu aspersum* distribution map in Australia (Atlas of Living Australia 2020)

*C. aspersum* now resident in Australia are believed to have originated in northern Europe (Smith, 1992) in the 1870's, however Blacket (2010) found that all the specimens he tested from Victoria and NSW 'appeared closely related to each other, and were most similar to those previously tested from western Europe'. As western Europe is the most likely source of future imports (both applicants) it is likely that the imported *C. aspersum* will be of a similar genetic stock – although bred to be slightly bigger.

As *C. aspersum* are the only species in the genus *Cornu* it cannot hybridise with any other species.

### ***Propagule pressure***

As *C. aspersum* have already established in Australia and spread to the extent of their range the impact of the release of large numbers of animals at different times and places is unlikely to have any further impact on the environment.

### ***Pathogens and parasites***

*C. aspersum* is a known host of nematodes of the Angiostrongylidae family (lungworms) many species of which are associated with diseases in dogs, cats and other mammal species (Colella et al 2017, Berger 2010). However, many of these lungworm species are already present in Australia (Berger 2010), including the rat lungworm *Angiostrongylus cantonensis* which can infect flying foxes and marsupials (Prociv and Carlisle, 2001). There is a low risk of further impact from these species being introduced due to the sanitary measures and quarantine requirements for the importation of live animals into Australia set out under the *Biosecurity Act 2015*.

### **Physical harm**

*C. aspersum* are unable to cause physical harm to humans or livestock.

### **Potential impacts of established feral populations**

*C. aspersum* is a known minor agricultural pest in Australia. No known environmental impacts are evident for Australia in the current literature. The snail is a minor social pest due to its feeding on ornamental and garden plants.

### **Risk mitigation**

*C. aspersum* has been established in Australia since the late 1800's and has likely reached the extent of its natural range.

**Table 1: Summary of risks and mitigation measures**

<b>Risk</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Mitigation measures</b>	<b>Overall risk</b>
Release or escape of adult specimens	likely	minor	Kept in specially fenced breeding and grow out facilities. Natural dispersal of adults limited to escapees. Unlikely to impact on numbers of wild snails.	Low
Release or escape of immature specimens	unlikely	minor	Juveniles also kept in breeding facilities. Natural dispersal of juveniles even further limited as compared to adults	Low
Disease transmission to native species populations	unlikely	minor	As the imported specimens will be kept in secure commercial breeding facilities and distributed once processed for human consumption this should limit the ability for these individuals to act as a disease or parasite vector to native fauna.	Low
Theft and deliberate release	unlikely	minor	There have been no recorded thefts of <i>C. aspersum</i> from commercial farms in Australia. Theft would most likely be to sell the snails for profit (as in Poland (News.com, 2011)). Deliberate release is unlikely but survival in the wild probable.	Low

The Department considers that this species poses a negligible risk to the Australian environment and can be listed under Part 1 of the Live Import List (for unregulated specimens).

### **Concerns raised and responses**

The Department undertook consultation with relevant ministers (or their delegates), government agencies and the public from 5 June to 18 July 2019. The Department received



two responses during this comment round from one state government and one non-government organisation. These comments were shared with Snails Pace and their responses are in *italics* (further departmental comment in brackets):

1. The SA Department of Environment and Water had questions regarding the origin of the imported snails, their size and age and the quantity. SA suggests that eggs be imported rather than adult snails and a portion of hatchlings be tested for disease to ensure their future disease status.

*Snails Pace replied that the snails would be imported from Cyprus, and that one shipment of 600kg of adult snails would be enough to set up the snail farm breeding program and provide snails for fattening and selling in 4-6 weeks. Only adult snails will be imported to ensure that they are the same age and size and ready to breed.*

(The volumes and origins of the snails imported are not specified in the live import listing and therefore are not relevant to this assessment. The source of the snail imports and disease status would be subject to an approval under the *Biosecurity Act 2015*).

2. The non-government organisation requested:

- a) qualification that *C. aspersum* cannot colonise native vegetation,

*Snails Pace replied that Dr John Stanisic, Queensland Museum (pers com) that “Cornu aspersum in Australia has not been recorded in native bushland even though it is widespread in suburbia. It has been found on the fringes where people have dumped their garden rubbish, or in places where human impact has occurred but **never in** native scrub or forest. The suggestion being that Australian vegetation typically has a hard outer cuticle not suited to the *Cornu radula* which favours soft leafy plant material”.*

- b) that the applicant “document the number of molecular lineages of the species already in Australia”,

*Snails Pace states that ‘The proposed Cypriot imports are likely to differ genetically from the established Australian populations which may also differ from each other. To what extent is unknown and largely irrelevant since they are all the same species and the imports are not likely to upset the status quo’, (Dr John Stanisic, Queensland Museum (pers com)), and the application stated that “DNA sequences of *C. aspersum* found in Australia have been added to the Barcode of Life Database” (Blackett, 2016).*

- c) further detail on packing and quarantine details with regards to the snail farm.

(Diseases and consequences for agriculture, livestock, and other exposure groups will be assessed as part of the Department’s Biosecurity Import Risk Assessment process and the relevant state and territory laws where the heliculture is being conducted).

The Department undertook a second consultation with relevant ministers (or their delegates), and state and territory government agencies between 8 July to 29 July 2020. The Department received no responses.

## **Conclusion**

Having undertaken an analysis and reviewed the available information, the Department recommends listing *Cornu aspersum* (Common Garden Snail) in Part 1 of the Live Import List.

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