



**EUROPEAN AND MEDITERRANEAN PLANT PROTECTION  
ORGANIZATION  
ORGANISATION EUROPEENNE ET MEDITERRANEENNE POUR LA  
PROTECTION DES PLANTES**

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**Report of a Pest Risk Analysis for *Pomacea* species in the ‘*canaliculata* complex’**



**Photo** Apple snail and egg clusters; **Courtesy:** Matteo Maspero (IT)

This summary presents the main features of a pest risk analysis which has been conducted on the pest, according to EFSA guidance. The full PRA record is also available (see under references)

**Pest:** *Pomacea* species in the ‘*canaliculata* complex’

**PRA area:** EPPO region

**Assessors:** Spanish Ministry of Environment and Rural and Marine Affairs (2011)  
EFSA PLH Panel on Plant Health (2012a, 2012b, 2013, 2014).

**Date:** 2012-2014.

The risk management part was reviewed by the Panel on Phytosanitary Measures during different meetings in **2015-2018**. EPPO Working Party on Phytosanitary Regulation and Council agreed that *Pomacea canaliculata* and *Pomacea maculata* should be added respectively to the A1 and A2 List of pests recommended for regulation as quarantine pests in 2018.

## STAGE 1: INITIATION

### Reason for doing PRA:

In 2010 the island apple snail (previously called *Pomacea insularum* (d'Orbigny, 1835) and now called *P. maculata*) was found invading rice fields in the Ebro Delta in Spain. Before then, it was not known to occur in the European Union and was not regulated. A Spanish pest risk analysis (2011) identified important plant health risks connected to *Pomacea* species. The available scientific evidence indicates that other *Pomacea* species may pose similar risks to plant health as identified for *P. insularum*. The Spanish PRA was further evaluated by EFSA and complementary Opinions were published in 2012, 2013 and 2014.

### Taxonomic position of pest:

Class: Gastropoda; Order: Architaenioglossa; Family: Ampullariidae ; Genus: Pomacea

*Pomacea* species in the 'canaliculata complex': four species *P. canaliculata*, *P. insularum*, *P. lineata* and *P. maculata* belong to the 'canaliculata complex', where *P. insularum* and *P. maculata* are recently considered to be synonyms.

Differentiation of *Pomacea* species on a morphological basis is difficult as within species variation is high and morphological similarities are shared between many different species.

## STAGE 2: PEST RISK ASSESSMENT

### PROBABILITY OF INTRODUCTION

#### *Entry*

#### Geographical distribution: (source EPPO GD)

#### ***Pomacea canaliculata:***

North America: USA (Arizona, California, Florida, Hawaii, Texas)

Caribbean: Dominican Republic.

South America (native): Argentina, Bolivia, Brazil, Paraguay, Uruguay

Asia: Cambodia, China (Fujian, Guangdong, Guangxi, Hainan, Sichuan, Yunnan, Zhejiang), Indonesia (Irian Jaya, Java, Sulawesi, Sumatra), Israel, Japan (Honshu, Kyushu, Ryukyu), Korea Republic, Lao, Malaysia, Philippines, Taiwan, Thailand, Vietnam

Oceania: Papua New Guinea

EPPO Region: Israel

#### ***P. maculata* (syn. *Pomacea insularum*)**

North America: USA (Alabama, Florida, Georgia, Hawaii, Louisiana, South Carolina, Texas)

South America (native): Argentina, Bolivia, Brazil

Asia: Cambodia, China, Israel, Japan, Malaysia, Philippines, Taiwan

EPPO Region: Spain, Israel

The EFSA Opinion does not provide data on the geographical distribution of *P. lineata*.

#### Major host plants or habitats:

Rice (*Oryza sativa*) fields

Natural wetlands such as rivers, shallow lakes and ponds (EFSA, 2014)

#### Which pathway(s) is the pest likely to be introduced on:

- Intentional import of the pest itself (e.g. for aquarium trade or as food)
- Contaminant of aquatic plants or live tropical fish (e.g. imported for the aquarium trade)
- Agents for aquatic weed control

### ***Establishment***

Plants or habitats at risk in the PRA area:

Paddy Rice (*Oryza sativa*)  
Natural wetlands such as rivers, shallow lakes and ponds (EFSA 2014)

Climatic similarity of present distribution with PRA area (or parts thereof):

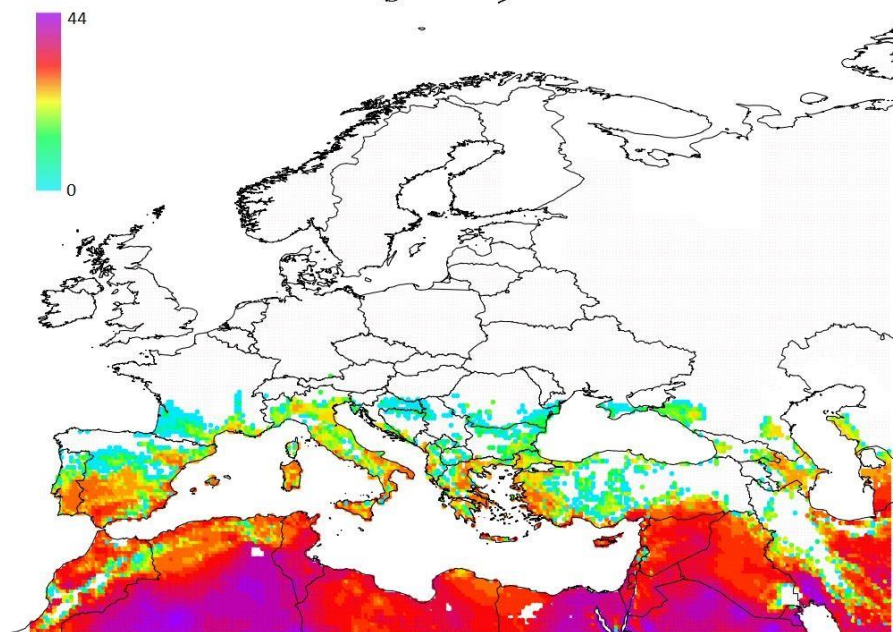
*P. maculata* is already established in Spain (Ebro delta) and is present in areas where climatic conditions are very similar part of Europe. A model on the population dynamics of the closely related species *P. canaliculata* was developed in EFSA 2013 to assess the potential distribution of apple snails in Europe.

Characteristics (other than climatic) of the PRA area that would favour establishment:

-

Which part of the PRA area is the area of potential establishment:

The area of potential establishment of the apple snails comprises only part of southern Europe including the rice production areas in Europe and most of the wetlands of southern Europe and the Balkans up to the latitude of the Danube River. It also includes the Southern part of the Mediterranean Basin where wetlands or rice fields occur.



Map 1. Potential distribution of Pomacea in the EPP0 region obtained by a population dynamics model based on a physiological approach (distribution of total potential biomass (g/m<sup>2</sup>) of *Pomacea canaliculata* juveniles + adults over Europe. The colour code in the legend corresponds to biomass values above 0). This map was extended to cover most of the EPP0 region by the author of the model for the EFSA opinion

### **POTENTIAL ECONOMIC CONSEQUENCES**

**How much economic impact does the pest have in its present distribution:**

In its natural range (South America), *P. canaliculata* has been considered 'harmless and useless', as it is neither an important crop pest nor human health hazard and it is not used as a human food or for any other purpose (Cazzaniga, 2006). However, where it has been introduced, it has caused serious economic harm, has become a human health problem in some regions, and has the potential to have serious environmental and biodiversity impacts.

In the Philippines, Thailand and Japan, farmers consider *P. canaliculata* to be the most serious pest of rice. According to Rawlings et al. (2007) *Pomacea insularum* and *P. canaliculata* pose the greatest threat to agriculture and native wetland ecosystems in the US.

**Describe damage to potential hosts in PRA area:**

Damage on rice is expected to be similar in the PRA area and in its invasive range.

With regard to the ecosystem services, EFSA (2014) concludes that the presence of the apple snail results in a moderate risk for genetic resources, climate regulation, pest and disease regulation and pollination in both the short and the long term. The risk for food is moderate in the short term and major in the long term. The risk for water regulation and erosion regulation is major in both the short and the long term. The risk for fresh water is massive in both the short and the long term. The risk for nutrient cycling and photosynthesis and primary production of macrophytes is massive in the short term and major in the long term. In the worst case scenario, the overall effect of the snail invasion on the shallow freshwater wetlands of southern Europe is major on the ecosystem services both in the short and in the long term.

For the biodiversity component, EFSA (2014) concludes that the presence of the apple snail results in a major risk for genetic diversity and native species diversity in both the short and the long term. For native habitat, the risk is massive in the short term and major in the long term. For threatened species and habitat of high conservation value, the risk is massive in both the short and the long term. In the worst case scenario, the overall effect of the snail invasion on the shallow freshwater wetlands of southern Europe is massive on the biodiversity in the short term and major in the long term.

**How much economic impact would the pest have in the PRA area:**

**Potential consequences for cultivated and managed plants: Major (for rice)**

**Potential consequences for the environment: Massive in the short term (5 years), major in the long term (30 years).**

**CONCLUSIONS OF PEST RISK ASSESSMENT**

**Summarize the major factors that influence the acceptability of the risk from this pest:**

**Estimate the probability of entry:**

The main pathway is intentional import. Intentionally imported volume is minor but of moderate frequency.

Entry as contaminant is difficult to evaluate.

**Estimate the probability of establishment:**

Very likely (the pest is already established in part of the PRA area).

**Estimate the probability of spread:**

Likely.

Natural spread occurs via rivers and canals, in which the snails crawl, drift, raft and float on floating material. Extreme weather events and flooding increase spread. In addition, attachment to other animals such as birds, cattle, horses, deer and aquatic invertebrates results in spread. Snails are further spread by human assistance through cultivation, transport of rice seedlings, aquaculture, aquaria, boats and other means of transportation, agricultural field machinery and irrigation. The risk of spread by human assistance may have decreased recently owing to the Commission Implementing Decision of November 2012, according to which the genus *Pomacea* shall not be introduced into or spread within the EU.

**Estimate the potential economic impact:**

**Potential consequences for cultivated and managed plants: Major (for rice)**

**Potential consequences for the environment: Massive in the short term (5 years), major in the long term (30 years).**

Eradication has been attempted in other regions of the world and has usually not been successful (EFSA 2012a).

**Endangered Area**

Rice production areas and wetlands of southern Europe and the Balkans up to the latitude of the Danube River, as well as in the Southern part of the

<b>Degree of uncertainty</b>	Mediterranean Basin. EFSA (2012) concludes that uncertainty regarding the probability of entry, establishment and potential for consequences as such is low, but high regarding the importance of trade (with regard to volume and frequency of intentional and unintentional introductions). The uncertainty related to the limits of the endangered area is medium thanks to the model developed in EFSA 2013. Regarding the uncertainty related to the risk of <i>Pomacea</i> spp. for the potential endangered area, the Panel considers it low.
<b>OVERALL CONCLUSIONS</b>	Potential consequences of the organism for cultivated and managed plants are major with low uncertainty, the effects on the environment are expected to be massive with low uncertainty.

### STAGE 3: PEST RISK MANAGEMENT

No single risk reduction method is sufficient to prevent the spread of *Pomacea* spp. snails in the PRA area. As the snail has already entered the PRA area, actions must be taken in order to both:

- prevent its spread within the endangered area of the EPPO region, which is essential given both the invasive character of the species and the difficulty in eradicating it once it is established; and
- minimise the snail's population size and the associated damage and eventually eradicate it in the Ebro Delta area.

### IDENTIFICATION OF THE PATHWAYS

**Pathways studied in the pest risk management** The only pathway covered in the Spanish PRA is the intentional import of *Pomacea* spp.  
EU 2012 also recommends measures for plants for planting (excluding seeds) that can grow in water or soil that is permanently saturated with water

### IDENTIFICATION OF POSSIBLE MEASURES

#### Possible measures for pathways

EFSA (2012b) notes that current methods of identification imply high uncertainty if risk reduction options are applied at the *Pomacea* single species level. It therefore recommends that measures should be applied to the entire *Pomacea* genus. This approach was adopted in EU Commission Implementing Decision 2012/697/EU as regards measures to prevent the introduction into and the spread within the Union of the genus *Pomacea* (Perry) (EU, 2012)

- **Intentional import of *Pomacea* spp.**

The only possible option is a ban:

- ban on importation into the PRA area of *Pomacea* spp.,
- ban on breeding and trade within the PRA area of *Pomacea* spp.

- **Plants for planting (excluding seeds) that can grow in water or soil that is permanently saturated with water**

*Measures related to the crop or to places of production*

None identified in the EFSA or Spanish PRAs.

The EPPO Panel on Phytosanitary measures considered that the following options are possible:

-plants should come from a Pest-Free Area according to ISPM 4 *Requirements for the establishment of pest free areas* OR

-plants should come from a Pest-Free Production Site according to ISPM 10 *Requirements for the establishment of pest free places of production and pest free production sites* OR

-plants should be grown under complete physical isolation according to EPPO Standard PM 5/8 *Guidelines on the phytosanitary measure 'Plants grown under complete physical isolation'*. In particular, the following conditions should be fulfilled:

- all the host plants for planting that enter the structure should be free from the pest
- the growing medium should be free from the pest
- use of pest free irrigation water
- prevention of contact with drainage water, or lateral and vertical movement of soil water
- cleaning and disinfecting of machinery before entering the structure or use of dedicated machinery.

### Measures related to consignments:

Plants should be inspected prior to export to detect presence of the pest and the consignment should be certified as free from the pest.

This measure is recommended in EU 2012 but the Spanish PRA notes that “Due to their small size, eggs or juveniles of apple snails may not be noticed during official phytosanitary inspections”. As a consequence the Panel on Phytosanitary Measures considered that this measure provides a lower level of protection than measures related to the crop or the site of production and does not recommended inspection prior to export as a standalone measure to prevent introduction.

**Measures for eradication** are considered in Spanish Ministry of Environment and Rural and Marine Affairs (2011), EFSA 2012a, and EU 2012. They include the delimitation of demarcated areas (with a buffer zone of 500m around the infested zone), the destruction of the pest in this area, intensive monitoring twice a year, and hygiene protocols for agriculture and aquaculture machinery.

### EVALUATION OF THE MEASURES IDENTIFIED IN RELATION TO THE RISKS PRESENTED BY THE PATHWAYS

*Pomacea* spp. have been imported for aquaria. The measures identified (ban on importation) have a large impact of the trade of *Pomacea* spp.

**Degree of uncertainty** Medium (possibility to detect eggs)

### IDENTIFICATION OF POSSIBLE MEASURES

PC= Phytosanitary certificate

Intentional import of <i>Pomacea</i> spp.	<ul style="list-style-type: none"><li>- ban on importation into the PRA area of <i>Pomacea</i> spp.</li><li>- ban on breeding and trade within the PRA area of <i>Pomacea</i> spp.</li></ul>
Plants for planting (excluding seeds) that can grow in water or soil that is permanently saturated with water	PC AND  Pest free area or Pest-free site of production or Grown under physical isolation according to EPPO Standard PM 5/8

### References

- EFSA Panel on Plant Health (2014) Scientific Opinion on the environmental risk assessment of the apple snail for the EU. 10.2903/j.efsa.2014.3641
- EFSA Panel on Plant Health (2013) Scientific Opinion on the assessment of the potential establishment of the apple snail in the EU. 10.2903/j.efsa.2013.3487
- EFSA Panel on Plant Health (2012a) Scientific Opinion on the evaluation of the pest risk analysis on *Pomacea insularum*, the island apple snail, prepared by the Spanish Ministry of Environment and Rural and Marine Affairs. EFSA Journal 2012;10(1):2552. [57 pp.] doi:10.2903/j.efsa.2012.2552.
- EFSA Panel on Plant Health (2012b) Statement on the identity of apple snails. EFSA Journal 2012;10(4):2645. [11 pp.] doi:10.2903/j.efsa.2012.2645.
- EPPO Standard PM 5/8 *Guidelines on the phytosanitary measure 'Plants grown under complete physical isolation'* doi:10.1111/epp.12340
- EU 2012. Commission implementing decision of 8 November 2012 as regards measures to prevent the introduction into and the spread within the Union of the genus *Pomacea* (Perry)
- Spanish Ministry of Environment and Rural and Marine Affairs (2011) Pest Risk Analysis on the introduction of *Pomacea insularum* (d'Orbigny, 1835) into the EU