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FINAL REPORT OF AN AUDIT

CARRIED OUT IN

SPAIN

FROM 16 TO 20 SEPTEMBER 2013

IN ORDER TO EVALUATE THE CONTROL MEASURES APPLIED FOR POMACEA

Executive Summary

This report describes the outcome of an audit carried out by the Food and Veterinary Office (FVO) in Spain, from 16 to 20 September 2013.

The objective of the audit was to evaluate the control measures for Pomacea sp.. *This organism is subject to measures in Commission Implementing Decision 2012/697/EU.*

The audit found that although the Spanish authorities have taken measures to eradicate or contain Pomacea *sp., in line with Decision 2012/697/EU, the pest has been systematically spreading in the infested zone and outbreaks were detected in the buffer zone in 2012.*

Eradication of Pomacea *sp., at least from rice fields, is technically possible. The aim of eradication is compromised, since not all the farmers apply the proposed official measures fully or properly. In addition, legislation requiring the implementation of such measures is not enforced and checked by the regional authorities. This is not in line with the provisions of Article 5 (1) of Decision 2012/697/EU.*

In the river Ebro, eradication is unrealistic in the near future and at the moment the aim is suppression of the pest.

Building on improved control measures and the strengthened involvement of stakeholders, an eradication plan was recently approved for 2013/14. The plan aims for permanent eradication in certain areas, stopping the persistent spreading of the pest in the delta and reducing damages in rice fields.

Recommendations are made in this report to address the shortcomings found.

Table of Contents

Abbreviations and definitions used in this report

Abbreviation	Explanation
CAS	Competent Authority(ies)
DAAM	Department of Agricultural, Livestock, Fishing, Food and Natural Environment
DGNEB	Directorate-General of the Natural Environment and Biodiversity
EU	European Union
FVO	Food and Veterinary Office
Ha	hectare
IPPC	International Plant Protection Convention
Km	kilometre
LIFE	Financial Instrument for Environment
MAGRAMA	Ministry of Agriculture, Food and Environment
MS	Member State(s)
SDPFHH	Sub-directorate General for Plant and Forestry Health and Hygiene
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1 Introduction

This audit took place in Spain from 16 to 20 September 2013 and was undertaken as part of the Food and Veterinary Office's (FVO) planned audit programme.

The FVO team consisted of two auditors from the FVO and one national expert from a Member State (MS), was accompanied throughout the audit by representatives of the Central Authority, Ministry of Agriculture, Food and Environment (MAGRAMA).

An opening meeting was held on 16 September at the headquarters of the Regional Authority, the Department of Agricultural, Livestock, Fishing, Food and Natural Environment (DAAM) in Barcelona during which, the objective, scope and itinerary for the audit were confirmed by the FVO team and additional information, necessary for the conduct of the audit, was requested.

2 Objectives

The objective of the audit was to evaluate the controls measures applied for *Pomacea* sp.

The following table lists the sites visited and meetings held in order to achieve these objectives:

Meetings/visits		**No.**	**Comments**
Competent Authorities (CAS)	Regional	2	Department of Agricultural, Livestock, Fishing, Food and Natural Environment. Barcelona
	Sub-regional	1	Ebro Territorial Directorate. Amposta
	Regional/sub-regional	1	Ebro natural park. Deltebre
	Regional/sub-regional	1	Rural agents. Deltebre
Plant health control sites			
Rice production sites		6	River Ebro delta
Places of production of susceptible plants		1	River Ebro delta
Irrigation associations		1	Amposta
Laboratory		1	Fauna recuperation centre

At the moment of the audit *Pomacea* sp. was only found in the river Ebro delta in Catalonia therefore, the audit was carried out in this area where, a demarcated area consisting of an infested zone and a buffer zone was established.

3 Legal Basis

The audit was carried out under the general provisions of EU legislation, in particular Articles 21 and 27a of Council Directive 2000/29/EC.

3.1 Relevant EU legislation

Council Directive 2000/29/EC provides for protective measures against the introduction into and spread within the EU of organisms harmful to plants or plant products.

Commission Implementing Decision 2012/697/EU introduced measures to prevent the introduction into and the spread within the Union of the genus *Pomacea* (Perry)

Full legal references to EU legislation are given in Annex 1.

4 Background

4.1 Pomacea sp.

According to scientific literature, snails of the genera *Pomacea* sp. (Perry), common name island apple snail, are considered important pests of aquatic environments. Originally from South America, they have spread to Southeast Asia, USA and in 2009 they were found in Spain. The most likely pathway for such dispersion is the aquarium and ornamental trade.

The snail's natural habitat is mainly slow moving waters: swamps, irrigation canals, streams, ponds, lakes and rivers. They are herbivores and extremely voracious. They have a fast growth rate (maturation of the juveniles at three months) and a high reproductive rate (clutches with 800 eggs). Apparently they have high tolerance to low winter temperatures, but very low tolerance to salinity. *Pomacea* sp. snails are mainly aquatic, they have a ctenidium for underwater respiration and a lung for aerial respiration. The snails are dioecious (separate sexes) with internal fertilization. They can live for more than three years. They move, by active crawling upstream and floating downstream.

The island apple snail was detected in the river Ebro delta in Catalonia in August 2009 in a drainage canal in the left part of the delta, and in July 2010 in neighbouring rice fields. The source of the infestation is believed to be a fish farm that existed nearby.

The snail was identified to be *Pomacea insularum* after genetic studies were carried out in March 2010. However, the DAAM does not exclude the possibility that *Pomacea caniculata* may also be present in the delta in small numbers.

The island apple snail is known to lay bright reddish-pink eggs in clutches above the waterline in emerged plants (including rice), trees and concrete or woody pillars.

In the river Ebro delta, the island apple snail can complete three reproductive cycles per year and the peak of population is reached by September. There is no tendency for land crawling but dissemination is very fast downstream by water floating. They crawl upstream around one km per year in the river and even faster in the canals, they also have a high capacity of invading the rice fields by crawling up from the drainage canals through the outlet pipes. The juvenile survival in the rice fields is very high. There is an intensive predation by rats in dried fields, however local birds do not recognize the snails and there are no predators of egg clutches. Carps are predators of juveniles but they are unable to control the large numbers of snails.

The *Pomacea* sp. are considered as agricultural pests of rice in several production areas of the world, capable of destroying the rice seedlings (up to 30 to 45 days after seeding). The total damage caused by the pest in the Ebro delta was seven tonnes of rice in one ha in 2011 and 42 t of rice in six ha in 2012. In 2013, 94.34 ha had damages but the total crop loss in tonnes was not known at the time of the audit.

4.2 Rice production

The rice production areas in Spain is around 105,000 ha, the main producing areas are: Andalucia (34,795 ha); Catalonia (21,498 ha); Extremadura (20,486 ha); Conunidad Valenciana (14, 350 ha); Aragon (12,017 ha). The total rice production in Spain is around 750,000 t/year.

The rice production area in the river Ebro delta is around 21,500 ha producing approximately 150,000 t of rice. In the infested zone there are 1,300 farmers and 4,000 rice plots and the area for rice production is around 11,500 ha. In the buffer zone there are 955 farmers and 5,522 rice plots and the area for rice production is around 10,000 ha.

The hydraulic dynamics of the Ebro delta is designed for irrigation of the rice fields. Changes in

water management have been very difficult to implement. Both sides of the delta are crossed by a network of canals which feed and drain water to the rice fields, mostly by gravity flow. The irrigation canals, which originate 40 km upstream, feed extensive flat fields, and then water is slowly concentrated into an out flowing drainage network discharging into the river, to open sea, shallow bays or coastal lagoons.

4.3 The river Ebro delta

The delta has a total area of 320 km^2 of which 20% are natural areas and 80% agriculture land (mostly rice production). The delta has been designated a Biosphere reserve, a Natura 2000 network and has a natural park within its boundary. The area is of great ecological richness with a wide variety of fauna and flora. The natural park lies along the coastal area and is spotted with lagoons, reed swamps and rushes. The delta is a popular area for leisure, visited by many tourists.

5 Findings And Conclusions

5.1 Organisational aspects of plant health controls

Legal requirements

Article 1(4) of Council Directive 2000/29/EC provides that Members States shall ensure a close, rapid, immediate and effective cooperation between themselves and the Commission in relation to matters covered by this Directive and that, to this end, each Member State shall establish or designate a single authority, which shall be responsible, at least, for the coordination and contact in relation to such matters.

Article 2(1)(g) of Council Directive 2000/29/EC requires that the responsible official bodies in a Member State shall either be the official plant protection organisation established under the IPPC, or any other State authority established at national level or at regional level, under the supervision of the national authorities. Article 2(1)(i) of the same Directive requires Member States to ensure that their public servants and qualified agents have the qualifications necessary for the proper application of the Directive.

Point 2 of Article 5 of Decision 2012/697/EU requires that an awareness raising programme is set up in a demarcated area.

Findings

5.1.1 Competent authorities

The Directorate General for Health of Agricultural Production of MAGRAMA is the single plant health authority. Its Sub-directorate General for Plant and Forestry Health and Hygiene (SDPFHH) acts as the single official body in the field of plant health. It is responsible for the transposition of the European Union (EU) legislation and represents Spain at international level in this area. It is responsible for policy relating to plant health under Council Directive 2000/29/EC.

The regional body concerned with agricultural matters is the DAAM, which is responsible for planning, implementing, supervising and enforcing legislation for *Pomacea* sp. eradication. Within this body, responsibilities for plant health matters lay with the Directorate-General for Agriculture and Livestock in particular the Plant Health Services. However, where actions are to be taken concerning *Pomacea* sp. eradication, it acts jointly with the Directorate-General of Rural Development, which coordinates the *Pomacea* sp. eradication plan and, the Directorate-General of the Natural Environment and Biodiversity (DGNEB). The latter body is responsible for natural parks and some of the area affected by *Pomacea* sp. lies partially within a natural park. Also under DGNEB there are 520 rural agents, who are responsible for law enforcement and, control and

surveillance of the environment and nature.

The region of Catalonia is divided into five sub-regions which mirrors the structure of the regional services in Barcelona. One of the sub-regions is the Ebro Territorial Directorate which coordinates and applies the eradication measures at local level. Six staff is permanently involved in *Pomacea* eradication.

Concerning the actions to be taken against *Pomacea* sp in the river, several central bodies are involved, especially in matters related to the water availability and management and movement of boats.

5.1.2 National and regional legislation

The EU Decision 2012/697/EU is directly applicable.

Apart from the general plant health national legislation, there is also specific national legislation applicable to *Pomacea* sp.:

Order ARM/2090/2011, of 22 July, establishing provisional protection measures against the island apple snail *Pomacea insularum* and *Pomacea canaliculata*, modified by Order ARM/2294/2011, of 19 August, amending Order ARM/2090/2011, of 22 July, establishing provisional protection measures against the island apple snail *Pomacea insularum* and *Pomacea canaliculata*.

Royal Decree 630/2013, of 3 August, regulating the listing the Spanish list of invasive exotic species.

I addition, several pieces of regional legislation regulating the controls and eradication measures for *Pomacea* sp, including mandatory measures for farmers, have been issued in the last three years:

Order AAR/404/2010, of 27 July, declaring the existence of an outbreak of island apple snail (*Pomacea* sp.) in the left hemi-delta of the Ebro delta.

Resolution AAR/3749/2010 of 18 November establishing control measures against the pest island apple snail (*Pomacea* sp.) in the left hemi-delta of the Ebro delta.

Resolution AAM/2519/2011 of 10 October, setting out the measures to be taken in order to control the island apple snail (*Pomacea* sp.) in the left hemi-delta of the Ebro delta.

Resolution AAM/1455/2012, of 16 July, setting out the measures to be taken in order to control the island apple snail (*Pomacea* sp.) in the left hemi-delta of the Ebro delta.

Resolution AAM/2434/2012, of 31 October, for which the treatment with sea water is defined as a control measure for the apple snail in certain areas of the left hemi-delta of the Ebro delta.

5.1.3 Guidelines and training

The DAAM has issued several guidelines, protocols and procedures for surveillance, treatments and cleaning of machinery. Leaflets with the morphology and biology of the pest are available. Training was provided to staff involved in the eradication plan.

- The FVO team noted that all of the staff met during the audit was fully familiar with the organism and that they had specific guidelines and procedures to follow.

5.1.4 Communication with stakeholders and awareness

The DAAM stated that they had issued a wide range of publicity and technical information to stakeholders in the delta. The DAAM website provides a range of information on the island apple snail.

There is a policy of involving even more the different stakeholders in the eradication of *Pomacea*

sp.. Recently, a new body, the 'Technical commission for island apple snail' was created to follow the eradication plan, which includes rice production organisations, the regional official services and an environmental organisation.

- The FVO team met several stakeholders involved in rice production in the delta and noted that they were fully familiar with the eradication and control of *Pomacea* sp.. Communication between the regional services and the stakeholders operates well.

The river Ebro delta is visited by many tourists. Road controls are carried out (see section 5.4.2.4). During these controls on private cars, drivers are alerted to the risks of spreading the island apple snail, only when the pest is found.

- During the visits in the delta, the FVO audit team noted that no posters or signs are in place alerting the general public and tourists to the presence of the pest, the demarcated area or to the risk of spreading *Pomacea* sp. to new areas.

5.1.5 Research and Laboratories

In order to improve the control of *Pomacea* sp., there are research projects being developed in 2013, namely: evaluation of the biodegradability of saponins; toxicity in saponins in bivalves; effect of agricultural practices on the island apple snail; impact of sea water treatment in the soils; trials for plant protection products efficacy.

In addition, a Financial Instrument for Environment (LIFE) project, involving several stakeholders, is awaiting approval. It will help to improve the tools available for managing the impacts of *Pomacea* sp. in the rice production.

A mollusc laboratory has been established within the 'Fauna recuperation centre', operating under the auspices of DGNEB. Research carried out involves trial of new plant protection products in order to improve the control of *Pomacea* sp. In the same location there is a facility for destruction by freezing live snails collected in the fields.

- The FVO team visited the laboratory where new plant protection products are being tested. Staff met were competent to carry out their tasks. The facility for elimination of snails is appropriate and there is no risk of spreading the island apple snail from there.

Conclusion

There is a clear structure and division of responsibilities between the competent authorities responsible for developing and implementing eradication measures against *Pomacea* sp. in Spain.

The legislation in place allows for the eradication and control of *Pomacea* sp.

There is a good awareness of the pest amongst staff and stakeholders. However, the awareness campaign does not cover tourists or visitors to the river Ebro delta. There is a risk that tourists may contribute to the spreading the pest to new areas. This is not in line with point 2 of Article 5 of Commission Decision 2012/697/EU.

Research aimed at a better control of *Pomacea* sp. is being carried out. The laboratory and the destruction facility work effectively.

5.2 Import of the island apple snail and of plants

Legal requirements

Article 1 of Decision 2012/697/EU establishes that *Pomacea* sp. shall not be introduced into or spread within the Union.

Article 2 of Decision 2012/697/EU establishes that plants for planting, excluding seeds, that can

grow only in water or soil that is permanently saturated with water originating in third countries may be introduced into the Union if they comply with the following requirements: they shall be accompanied with a phytosaniatry certificate, which includes under the heading 'Additional declaration' the information that the plants have been found free from *Pomacea* sp. prior to leaving the third country concerned.

On entry, the plants shall be inspected by the responsible official body at the point of entry or point of destination to confirm that they meet the requirements laid down above.

Findings

5.2.1 Import and trade of snails

The SDPFHH stated that the import of live *Pomacea* sp. snails has been prohibited, not only by Decision 2012/697/EU but also in the national legislation for exotic invasive species. After the publication of the EU Decision, veterinary border inspectors were made aware of this prohibition.

Internal controls of pet shops in Catalonia are carried out by rural agents of DAAM to ensure that no snails are traded.

Concerning the trade of *Pomacea* sp. these rural agents are in charge of inspecting pet shops selling exotic animals. In Catalonia, there are around 800 pet shops and importers of animals, which have been inspected in recent years by the rural agents as shown in table 1.

Table 1 – Inspections for *Pomacea* sp. in pet shops and importers of exotic animals in Catalonia

Year	No inspections	Findings	No of snails destroyed
2011	291	32	339
2012	481	1	1
2013	409	0	0

Most of the findings of *Pomacea* sp. took place in 2011 and after the initial awareness campaign, no further findings occurred.

5.2.2 Import of plants

Plant health border inspectors are responsible for checking the requirements of 2012/697/EU for imported plants. Table 2 below lists the imports from third countries into Spain of aquatic plants.

Table 2 – Imports of susceptible plants from third countries in Spain

Year	No consignments	Origin
2012	10	China
	25	Morocco
	1	Turkey
	3	Vietnam
2013	1	Canada
	12	China
	7	Indonesia
	1	Malaysia
	29	Morocco
	28	Singapore
	1	Taiwan
	3	Thailand
	4	Vietnam

In 2013, Morocco and Singapore were the main providers of aquatic plants to Spain. Most of the consignments were imported through Madrid airport.

Conclusion

The import and trade of *Pomacea* sp. is prohibited in Spain in accordance with the EU provisions. Imported aquatic plants are inspected in accordance with Decision 2012/697/EU.

5.3 Surveys of *Pomacea* sp.

Legal requirements

Article 4 of Decision 2012/697/EU establishes that MS shall conduct annual surveys for the presence of *Pomacea* sp. on rice fields and, where appropriate other plants in fields or watercourses. Member States shall notify the results of those surveys to the Commission and to the other Member States by 31 December of each year.

Article 5 of Decision 2012/697/EU requires that, based on the results of the surveys, if a Member State finds *Pomacea* sp. to be present in a field or watercourse in its territory where its presence was previously unknown, the Member State shall without delay establish, or where appropriate, amend a demarcated area consisting of an infested zone and a buffer zone.

The infested zone shall include the places where the specified organism has been found to be present. Where a part of a cultivated field is in the infested zone, the rest of that field shall be part of the infested zone. A buffer zone of a width of at least 500 m shall be established around the infested zone. However, that buffer zone shall only include water courses and areas that are saturated with fresh water. Where the infested zone includes a part of a water course, the buffer zone shall include

that water course for a length of at least 1,000 m downstream and 500 m upstream from the location where the specified organism has been found to be present.

Section 2 (b) of Annex 2 of Decision 2012/697/EU, requires an intensive monitoring for the presence of *Pomacea* sp. by inspections twice a year with a specific focus on the buffer zone.

Findings

5.3.1 Survey in Spain

The national survey is coordinated by SDPFHH and covers the all Spain. A national survey protocol for *Pomacea* sp. is in place to harmonise the surveys at national level. The protocol contains chapters on: the biological cycle of the pest, symptoms and damages, monitoring and a survey form.

At the time of the audit, the SDPFHH informed the FVO team that although the final results of the national surveys were not yet available, there were no occurrences of the island apple snail in any other region of Spain. The Ebro delta in the south of Catalonia remains the only demarcated area in Spain. The much smaller rice production area in Girona (north of Catalonia) is free from the pest.

5.3.2 Demarcation of the area

As a result of the surveys, a demarcated area was established in Catalonia.

The infested zone, is located the Lower Ebro district and covers all the rice production area on the left part of the delta and therefore, the rice infested fields (2,300 ha) and infested canals. It includes the following municipalities: Camarles, Deltebre, L'Aldea and L'Ampolla.

The buffer zone covers the remaining area of the Lower Ebro district, including the following municipalities: Aldover, Alfara de Carles, Benifallet, El Perello, L'Ametlla de Mar, Pauls, Roquetes, Tivenys, Tortosa and Xerta and, all municipalities in the district of Montsia: Alcanar, Amposta, Els Muntells, Freginals, Godall, La Galera, La Senia, Mas de Barberans, Masdenverge, Sant Carles de la Rapita, Saint Jaume d'Enveja, Santa Barbara and Ulldecona.

- The audit team confirmed that the demarcated area was established with much larger distances than required in the EU legislation.

Figure 1 – Pomacea sp. demarcated area in Spain

5.3.3 Intensive monitoring in the demarcated area

In the demarcated area, the survey strategy is based in the visual detection of egg clutches in rice fields, irrigation and drainage canals and in the river. The survey is also used to quantify the levels

of infestation and the dynamics of the island apple snail spreading.

The survey is carried out by DAAM staff. In addition, the natural park staff, the farmers and the two irrigation associations of the delta also participate actively in the survey and notify the regional services of the presence of *Pomacea* sp.

Every year, four surveys are conducted in the demarcated area: at the start and finish of rice cultivation and two additional surveys during cultivation. A minimum of two visual inspections are carried out every year on the network of canals.

The intensive monitoring in the infested zone was carried out in all of the rice producing area (11,512 ha).

In 2012, the intensive monitoring in the buffer zone was carried out in 4,450 ha of rice producing area.

- During the visits in the infested zone, the FVO audit team could confirm the large dispersion of the pest. Egg clutches were obvious and prevalent in many rice fields and irrigation and drainage canals. The pest was also very visible in several parts of the river Ebro.

One lagoon and the final stretches of the river belonging to the natural park, are infested with *Pomacea* sp.

The DGNEB is actively involved in the eradication and surveillance of *Pomacea* sp.. This is covered by the plan established by DAAM for which the natural park contributes by surveying *Pomacea* sp. and, providing machinery and boats. The staff is trained to recognise the pest. In case of findings, the DAAM is immediately informed by e-mail. Also the 'Fauna recuperation centre' is used for *Pomacea* sp. studies.

- The audit team met with staff from the natural park who informed that the river Ebro delta is subject to exotic fish invasions. Surveys are carried out to detect the presence of new invasive species. If they are found, the next step is to prevent their spread and then try to eradicate them. Concerning the impact of *Pomacea* sp. on the environment they stated that, at the moment, this is not noticeable. However, for birds, it was noted that their total number has reduced but the number of birds in the buffer zone has increased. This could be explained by the option of drying out large areas in the infested zone.

Conclusions

The demarcation of the area was established in accordance with the provisions of the EU legislation. The *Pomacea* sp. instensive monitoring in the demarcated area is carried in line with Decision 2012/697/EU. The pest is widespread in the infested zone. The staff of the natural park is aware of the pest and fully involved in the eradication plan.

5.4 Control measures in the demarcated area.

Legal requirements

Article 3 of Decision 2012/697/EU establishes that plants for planting, excluding seeds, that can grow only in water or soil that is permanently saturated with water originating in demarcated areas may be moved into non-demarcated areas within the Union if they are accompanied by a plant passport.

Article 5 of Decision 2012/697/EU 2nd paragraph establishes that in the demarcated area Member States shall take all necessary measures for the eradication of the specified organism. Eradication measures taken by Member States in demarcated areas shall include the following:

- the removal and destruction of the specified organism;

- intensive monitoring for the presence of the specified organism by carrying out inspections twice a year with a specific focus on the buffer zone;

- Member States shall provide for a hygiene protocol for all used agriculture and aquaculture machinery which may come into contact with the specified organism and be capable of spreading it.

5.4.1 Movement of plants

Findings

There is only one nursery in the demarcated area that is registered and inspected by the DAAM. The main plant species produced in the nursery that are considered to be *Pomacea* susceptible plants are: *Iris* sp. *Juncus* sp. *Claudium* sp., *Scirpus* sp., *Phragmites* sp. and *Typha* sp. All these plant species may be used in wetlands.

- The audit team visited the nursery in the demarcated area. At the time of the visit, susceptible plants were being produced from seeds. However due to the recession, there had been no trade of such plants since the EU Decision was approved therefore, no plant passports had been issued. The plants were being produced in plastic pots above the ground, therefore the risk of island apple snail infestation is minimised. The producer intends to start selling plants in the near future to clients located in different areas of Spain.
- The nursery is authorised to issue its own plant passports which are attached to the delivery note. Inspectors from DAAM have visited the place of production to inspect the production of susceptible plants, every three months since the approval of the EU Decision.
- The presence of island apple snail has never been detected in the nursery.
- The producer was aware of the island apple snail and the risks of spread by trade of plants for planting.

Conclusion

No plant passports have been issued so far for regulated plants under Decision 2012/697/EU. Planned future issuance will be from places of production that are under official control.

5.4.2 Infested zone

Immediately after the initial findings in 2009, DAAM implemented an action plan aimed at eradicating the outbreak. The main objectives of the action plan for *Pomacea* sp. were: intensive survey; prevent rice crop damage; remove the pest from irrigation and drainage network; control and eradicate the pest from the river Ebro and lagoons that act as a reservoir: prevent invasion of the buffer zone.

The DAAM stated that the main difficulties found in the implementation of the action plan were: *Pomacea* sp. is an extremely invasive pest with a high rate of reproduction and high capacity of dispersion; the complex management of the irrigation and drainage network in the delta; the environmental protected area; the weather (flooding and heavy rainfall); stakeholders with different and sometimes contradictory views (farmers, hunters, fishermen etc.).

The main reason for the initial spread throughout the infested zone, was the use of water from the draining canals (heavily infested by island apple snail) that was pumped back to the main irrigation canals, to maintain their water flow when needed. Such practices promote the wide dispersion in the area of the island apple snail, through the irrigation canals network. At this stage, the river Ebro was also heavily infested through the two main drainage canals in the infested zone that end in the river. Today, the main and secondary irrigation canals are free from the pest but tertiary canals and small ditches are infested.

The island apple snail was detected in 576 ha of rice fields in 2010, 847 ha in 2011, 1,576 ha in 2012 and around 2,300 ha in 2013.

In order to deal with the persistent spread of the pest in the infested zone it was decided to design and approve a new eradication plan for 2013/14. The plan is based on the new technical information which became available and the strengthened involvement of stakeholders. Although most of the measures hereunder have been used in the past, they have been improved and they will be used in the new plan.

Eradication measures

The main eradication measures used in the infested zone are:

- sea water treatment, considered as the most efficient, reaching total eradication of *Pomacea* sp. from the fields;

- drying rice fields and treatments with saponins, considered very efficient for the elimination of the pest;

- traps with attractant, widely used;

- in the canals and in the river Ebro, collection and destruction of adults and egg clutches and elimination of riparian vegetation.

The sea water treatment consists of flooding the rice fields with sea water for 30 days followed by flooding the field with freshwater for 60 days. Initially, the sea water has to flood the drainage canals (generally located at a lower level than the sea) or in certain cases is pumped directly from the sea. After the canal is flooded, the water is pumped into the rice fields. The operation requires funding for pumping the sea water and for a proper maintenance of the equipment in the canals. The main problem with the treatment is that sensitive species may also be eliminated from the fields or canals.

In the winter 2011/12, 238 ha of rice fields were treated with sea water and in the winter 2012/13 the treated area increased to 650 ha. It is envisaged to treat 2,300 ha of rice fields during the winter 2013/14. In the winter 2010/11, 12 Km of drainage canals were treated with sea water and in 2012/13, 20 Km of drainage canals have undergone the same treatment.

The field drying treatment is important since it reduces the activity of the snails and eliminates one generation of juveniles, which are very susceptible to the dry conditions in the field. The field is kept dry during the winter for three to four months. The mortality rate depends on the winter conditions and the soil humidity but the DAAM stated that a rate of 85-95 % is expected. The treatment was used in the winters 2010/11 and 2011/12 with positive results but it was not carried out in the winter 2012/13. It is envisaged to treat 6,000 ha of rice fields in the winter 2013/14.

Saponins are secondary metabolites found in natural sources, in particular in various plant species. They produce a soap-like foam when shaken in aqueous solutions. Saponins are used mainly to control the snail population in rice fields to avoid extensive pest damage to the crop. The treatment generally takes place in Spring and Autumn and is very efficient, 75-100 % mortality expected. Saponins are also used to treat infested irrigation or drainage canals when a minimal ecological impact is anticipated. The spraying is not efficient at the final stage as the crop is too dense and the canopy prevents the product reaching the water and eliminating the snails.

In 2011, an area of 417 ha of rice was treated with saponins. In 2012, an area 845 ha of rice fields and 75 km of canals was treated. In 2012, 75 Km of drainage and irrigation canals were sprayed with saponins.

Attracting blocks containing a molluscicide product are also used to eradicate island apple snail.

In 2011, 4,311 blocks were placed in 104 rice fields and in 2012, 20,930 blocks were placed in 226

rice fields.

The manual or mechanised elimination of adults and egg clutches is carried out mainly in canals. The manual elimination (crushing or squashing the eggs) is carried out by teams and in the mechanised elimination a propane burner is used along the banks of the canals.

In 2011, 230,234 snails and 319,127 egg clutches were manually destroyed in drainage canals. In 2012, 219,673 snails and 49,308 egg clutches were removed. In 2011, 38.5 km of canals were subject to mechanised destruction of eggs. In 2012, 40 km were treated.

A new mechanised elimination treatment, through suction by vacuum and separation of adults from the canals is now available. In 2013, 60,000 adult snails have been eliminated in such way.

Depending on the situation in the field to be eradicated and the efficiency of the measures, they may be taken individually (generally, sea water treatement) or if needed in combination (treatments with saponins followed by drying the field). The same applies in the canals, where treatments with saponins may be followed by keeping the banks free of vegetation.

Containment measures

The main containment measures used in the infested zone are:

- physical barriers, used to control the entry and exit of the pest in rice fields. In the irrigation and drainage canals, physical barriers are also placed to control the movement of the island apple snail;

- mandatory movement control and cleaning of the machinery.

Physical barriers are put in place to prevent the movement upstream or downstream of the island apple snail. Farmers are recommended to set physical barriers such as outlet wells and meshes in the rice fields. Since the snail is unable to move upstream if there is a water fall, the water inlet and outlet pipes are elevated to avoid the movement of the snail from the field back to the irrigation canal and from the drainage canals back to the fields. Also sluice gates were put in place to prevent the access of infested waters to the river or to other canals.

In 2011, 805 actions were carried out to install or modify water inlets or outlets of rice fields. In addition, 456 meshes were installed at the entry of rice fields. In 2012, 100 actions were carried out to modify water inlets or outlets of rice fields and 100 meshes were installed at the entry of rice fields.

The DAAM is also considering, for the future, promoting rotation with other crops in order to reduce the prevalence of the island apple snail. However, it will be very difficult to implement such measure since the farmers are specialised in rice production and it is very difficult to change and start producing other crops.

Farmers are visited and informed about the measures which are mandatory under the regional legislation.

The FVO audit team visited several fields in the infested zone, located in the left part of the delta.

- In the first field the incoming water was passing through a net to prevent the entry of the snails and a new outlet well for draining water had been recently installed.
- The audit team noted that the net was wrongly placed allowing for the entry of snails from the infested irrigation canal. The latter, had been previously treated with saponins and disinfested, but it had been reinfested. The new outlet well works properly preventing the movement of the snails to the draining canal. The draining canal which was heavily infested, had a trap to avoid the upstream crawling of the snail.
- No specific follow up is carried out regarding the obligation of the farmer to implement the necessary means to avoid their fields being invaded and to prevent spreading to

neighbouring fields and canals. The main consequence of not implementing the control measures at field level is that irrigation canals and additional fields will become infested, therefore jeopardizing the eradication of the island apple snail.

The DAAM stated that technically, it is impossible to use a fine mesh since it would stop the flow of the incoming water. On the other hand, if the mesh is too large juvenile snails will be able to infest the irrigation canal. They also added, that it is very difficult for the services to confirm that all the farmers correctly implement the control measures. There are many farmers and many rice plots in the delta. DAAM believes that at the moment around 60 to 70 % of the farmers implement the proposed measures.

A policy of good control practices has been developed for *Pomacea* sp. and the regional legislation requires that farmers implement the control measures proposed by DAAM in the infested rice fields. Sanctions are foreseen in cases of non compliance but at the time of the audit, no sanctions had been established for such cases.

It is considered that re-invasion of the island apple snail is the main factor reducing the effectiveness of the eradication measures. To avoid re-infestation DAAM sees a need for better collaboration and involvement of farmers and irrigation associations. Therefore, the eradication plan includes a more active involvement of farmers in implementing eradication measures at the farm level. DAAM also stated that it will also be very important to have the participation of the irrigation managers in the maintenance of the barriers to avoid spread of the pest into the canals and their active participation in the continuous survey and in the eradication tasks.

- A second heavily infested field was visited by the audit team. The producer stated that there were heavy damages at the beginning of the crop and the farmer had to sow three times. In addition, three treatments with saponins were carried out. This year the temperatures in spring were lower than the average and the snail emerged for a long time span rendering the control very difficult.
- The farmer told the FVO team that the field was not dried out during last winter, therefore the level of the snail population was very high. He also mentioned that he was more aware of the problem, and had recently attended a meeting where the eradication plan, requiring a more intense involvement of the farmers, was presented.

The DAAM stated that at the beginning it was very difficult to involve the farmers on the control of the snail. However, as the damage becomes more obvious in the fields, farmers are cooperating more.

- The audit team also visited fields where the island apple snail was eradicated with sea water. An area of rice fields was flooded with sea water during the winter 2012/13. The results so far have been positive since no findings have occurred during the present rice crop season.

Conclusion

An eradication plan for 2013/14, including enhanced eradication measures and seeking full involvement of all stakeholders, will be implemented from October 2013. Despite the fact that regional legislation requires mandatory compliance with the official measures at farm level, this is not fully checked and enforced by the DAAM staff. No sanctions have been established for cases of non compliance. Eradication with sea water is an effective tool to eradicate *Pomacea* sp.

5.4.2.1 Situation in the river

Currently, 30 Km of the river are known to be infested by the island apple snail.

No successful measures have been found to eradicate the pest in the river. Such measures would be important to mitigate the movement of the island apple snail upstream and reduce the level of

populations in the river.

Until now, the eradication treatments implemented are manual collection of adults and egg clutches and elimination of the vegetation in the river banks for egg clutches destruction. The aim of such actions is to maintain levels of the snail in the river below the threshold of population explosion.

In 2011, 109,112 adults and 193,790 egg clutches were eliminated. In 2012, 38,137 adults and 65,186 egg clutches were eliminated. The DAAM informed the audit team that, in 2013 due to the floods in the river until June, it was not possible to implement the action of collecting snails and destruction of egg clutches. In 2011 and 2012, 10 km of river banks had the vegetation eliminated.

- The audit team visited one site in the left part of the Ebro river. The DAAM stated that the three main canals draining into the river are closed. Two of them had new sluice gates were built in order to avoid the flow of infested freshwaters into the river. The third exit is closed and in the past it was hardly used. The water is now flowing to the sea through the canals draining network.
- In the buffer zone and in order to avoid infestation from the river into the rice fields, nine main drainage canals had their outlets repaired in such a way that pipes were elevated in relation to the river waterline.

Conclusion

Although measures have been taken to reduce the level of infestation (supression), the pest is widespread in the part of the river crossing the delta. No eradication measures were carried out in the river in 2013 due to flooding. This is not in line with Decision 2012/697/EU which requires that all measures to eradicate *Pomacea* sp. should be taken and an integrated eradication approach for rice fields, canals network and river, should be in place.

5.4.2.2 Movements of machinery, cars and boats

There is a substantial movement of agricultural machinery in the Ebro delta. Some farmers have rice plots in both parts of the delta and move their machinery between them. In addition, companies rent machinery to farmers in both parts of the delta.

All potentially infested agricultural machinery must be cleaned before being moved to the buffer zone, or to other areas in Spain. There are two companies authorised to carry out the cleaning of machinery and these companies issue a certificate after each operation. The drivers of agricultural machinery are obliged to carry the certificate in their vehicles.

In 2010, 72 pieces of agricultural machinery were cleaned, 127 in 2011 and 105 in 2012.

There are no cleaning requirements for agricultural machinery moving within the infested zone. However, it is planned to require the cleaning of machinery before entry into the areas where the island apple snail is going to be eradicated to prevent reinfestion of such areas.

The rural agents from DAAM and the local police carry out controls at the two bridges that cross the river linking the two parts of the delta. During the road control, the effectiveness of the cleaning and the certificate are checked.

- The FVO team visited one place where agricultural machinery is cleaned. One farmer was moving the machinery to the buffer zone where he owns additional rice fields. The farmer was aware of the possibility of spreading the snail through agriculture machinery and knew that police forces carry out road controls.
- The cleaning was carried out by high pressure washing of the parts of the machinery that may have been in contact with the soil. There is a pump that brings water from the nearby main irrigation canal to wash the machinery. It may take one to two hours to clean a rice

harvester.

- The FVO team noted that the place used by the company for cleaning the machinery was not appropriate (five metres from the main irrigation canal) and that the draining water and soil waste was not going to a proper sewage system. Therefore, the risk of spreading the pest to the irrigation canal through waste water and soil was not addressed.

Private cars may also be inspected. If snails are found they are removed and drivers are informed about the risks of taking snails to other areas.

In 2012, 23 road controls were carried out and in 2013 until the time of the audit seven controls had taken place. During the road controls *Pomacea* sp. was not found.

The rural agents also inspect freshwater fishing and they check if fishermen use live snails as bait.

In 2012, 110 controls were carried out and in 2013, 73 controls had been carried out by the time of the audit.

In relation to the possible spreading of the island apple snail in the river through boats, the DAAM stated that there is no risk of such spreading since the snail does not lay eggs on moving objects, they prefer solid structures. However, this has not been be fully investigated.

Conclusion

There is an effective control of agricultural machinery from the infested zone that should mitigate the spread of the pest to new areas. The location of the place where the machinery is cleaned was not appropriate and does not prevent further spread of the pest, which is not in line with the Section 2 (c) of Annex II of Commission Decision 2012/697/EU. The risk of spreading through the movement of boats has not been addressed by the eradication measures put in place by DAAM.

5.4.3 Buffer zone

In October 2012, *Pomacea* sp. was detected for the first time in the buffer zone. The 10 findings occurred in irrigation and drainage canals and were immediately notified to DAAM, by workers of the irrigation south bank association. The crops had already been harvested.

The eradication and containment measures applied in the buffer zone are basically the same as indicated in section 5.4.2.

Several additional measures were immediately taken by DAAM in order to eradicate the pest from the area namely: closure of all the canals; intensification of the survey in all potentially infested irrigation and drainage of canals; treatments with saponins; reinforcement of the awareness campaigns targeting all stakeholders.

A total of 975 Km of canals were dried out and 13,000 points of water entry in the fields were surveyed for detection and elimination of snails and egg clutches.

The distribution of the findings throughout the area and the fact that they were all made in a short period of time led the DAAM to exclude natural spread as the cause. The DAAM informed the FVO team that the main suspicion is that the introductions were intentional and rural agents are investigating possible suspects and the motivation for the introductions.

In all cases the following measures were taken: treatment with saponins after harvest; ploughing the field; thorough cleaning of all agricultural machinery; further treatments in the field with saponins; drying of fields until April and surveillance during the winter.

- The FVO team visited three outbreak areas in the buffer zone. In the first field, after the findings in October 2012 two treatments with saponins were immediately carried out and no snails were found during the follow-up survey. During the Spring 2013, there were no

findings of the pest and it was believed that the pest had been eradicated however, the snail was found again in August 2013. The DAAM stated that it was unlikely that if the pest was present in the field it would remain undetected until the Summer and therefore, in this case they believe that two separate illegal introductions of the snail had occurred, one in 2012 and another one in 2013.

- During the visit, the audit team noted that egg clutches were present in the rice field. Although the pest was present in the field, no immediate eradication measures had been taken.
- The DAAM informed the audit team that the farmer was allowed to harvest the crop, and only thereafter, eradication measures are going to be implemented.
- The FVO team also noted that water was entering canals, which eventually entered in the river Ebro. Although a net was placed in the outlet of the field it was not enough to prevent the risk of spreading of *Pomacea* sp. to neighbouring fields or to the river. This would mean that the river could get infested several kilometres upstream from the present known location of the island apple snail (Amposta bridge).
- The second place visited was a draining canal where egg clutches and adults were found also in October 2012 by workers from the irrigation association. In order to eradicate the pest, eggs clutches were destroyed and treatments with saponins were carried out. However, new findings occurred in May 2013 and further treatments with saponins followed by surveys, were carried out every fortnight. Neighbouring fields were also surveyed for the presence of the snail. So far, no further findings of the island apple snail have occurred.

An irrigation canal was also found infested. The eradication measures taken at the time were: to close the canal, destroy egg clutches, use a suction machine to collect adult snails and treat with saponins.

An intense survey was carried out during one month in the rice fields irrigated with water from the canal, no island apple snail was found.

- In the third field visited, the presence of the snail was notified also by locals in October 2012 to the irrigation association. The action taken was to close the irrigation canal, treat the fields before harvest and carry out two additional treatments with saponins immediately after harvest. In June 2013, adults and egg clutches were found again in the field. In the winter 2013, it is planned to treat the infested field with saponins after harvest and flood the field and the neighbouring fields with sea water, in a total area of 20 ha.

Concerning the risk of spreading by the movement of machinery, the DAAM informed the FVO team that the non-infested fields are harvested before the infested fields to prevent spreading the pest.

At the end of the intervention to eradicate the 10 outbreaks in the buffer zone, extensive areas of rice field, all irrigation (600 Km) and drainage (500 Km) canals network had been surveyed by the irrigation association. The lagoons in the delta were also surveyed by the rural agents. Around 26 km of irrigation and drainage canals had been treated.

Conclusion

In one place, the finding of the pest did not trigger immediate eradication measures. In addition, the eradication measures, once implemented, were not adequate since they resulted in a risk of further spreading the pest, upstream in the river.

6 Overall Conclusions

The audit found that although the Spanish authorities have taken measures to eradicate or contain *Pomacea* sp., in line with Decision 2012/697/EU, the pest has been systematically spreading in the infested zone and outbreaks were detected in the buffer zone in 2012.

Eradication of *Pomacea* sp., at least from rice fields, is technically possible. The aim of eradication is compromised, since not all the farmers apply the proposed official measures fully or properly. In addition, legislation requiring the implementation of such measures is not enforced and checked by the regional authorities. This is not in line with the provisions of Article 5 (1) of Decision 2012/697/EU.

In the river Ebro, eradication is unrealistic in the near future and at the moment the aim is suppression of the pest.

Building on improved control measures and the strengthened involvement of stakeholders, an eradication plan was recently approved for 2013/14. The plan aims for permanent eradication in certain areas, stopping the persistent spreading of the pest in the delta and reducing damages in rice fields.

7 Closing Meeting

A closing meeting was held on 20 September 2013 at the headquarters of the DAAM in Barcelona, with representatives of the Single Authority and the Regional Services visited during the audit.

During the meeting, the preliminary findings and conclusions of the FVO team were presented, which were provisionally accepted by the authorities.

8 Recommendations

The National Plant Health Organisation of Spain is recommended to:

N°.	Recommendation
1.	Ensure that all measures necessary for the eradication of Pomacea sp. are taken, and in particular that the measures required at Art. 5 (1) of Decision 2012/697/EU, are fully implemented and sanctions are established in cases of no compliance.
2.	Ensure that appropriate biosecurity measures, in line with Art. 5 (1) of Decision 2012/697/EU, are implemented in places where agriculture machinery is cleaned.
3.	Ensure that all the measures necessary for the eradication of Pomacea sp. in line with Art. 5 (1) of Decision 2012/697/EU are taken, and they are implemented in such a way that further risks of Pomacea sp. spreading to new areas is prevented.
4.	Ensure that investigations are carried out to determine if there is a risk of spreading Pomacea sp. through the movement of boats in the Ebro river and if needed, measures are taken to address such risk, in line with Art. 5 (1) of Decision 2012/697/EU.
5.	Ensure that the awareness programme is extended and covers information to be provided to the general public and tourists visiting the river Ebro delta, in line with Art.

N°.	Recommendation
	5 (2) of Decision 2012/697/EU.

The competent authority's response to the recommendations can be found at:

http://ec.europa.eu/food/fvo/rep_details_en.cfm?rep_inspection_ref=2013-6803

Annex 1 - Legal References

Legal Reference	Official Journal	Title
Dec. 2012/697/EU	OJ L 311, 10.11.2012, p. 14-17	2012/697/EU: 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)
Dir. 2000/29/EC	OJ L 169, 10.7.2000, p. 1-112	Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community