

First records of the pest species *Cydalima perspectalis* (Walker, 1859) and *Paysandisia archon* (Burmeister, 1880) in Gibraltar (Lepidoptera: Crambidae & Castniidae)

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Primeros registros de las especies plaga *Cydalima perspectalis* (Walker, 1859) y *Paysandisia archon* (Burmeister, 1880) en Gibraltar (Lepidoptera: Crambidae & Castniidae)

Keywords: *Cydalima perspectalis*; *Paysandisia archon*; *Lepidoptera*; *Crambidae*; *Castniidae*; Gibraltar; Iberia.

Palabras claves: *Cydalima perspectalis*; *Paysandisia archon*; *Lepidoptera*; *Crambidae*; *Castniidae*; Gibraltar; Península Ibérica.

Abstract

The invasive species *Cydalima perspectalis* (Walker, 1859), a pest of the genus *Buxus* L. and *Paysandisia archon* (Burmeister, 1880), a pest of palms (Arecaceae) are recorded for the first time from Gibraltar. We report the current status of both species in Gibraltar and possible damage to native species of plants. *Paysandisia archon* is damaging *Chamaerops humilis* Rebel, in the urban environment, and native populations of this palm are at risk. *Cydalima perspectalis* has also been detected on plants of the genus *Rubus*, *Ruscus*, *Acer* and *Fraxinus*, in Eastern Europe.

Introduction

The moth genus *Cydalima* Lederer, 1863 is comprised of seven species (Gbif.org), including the box tree moth *Cydalima perspectalis*. All are native to Asia (Mally *et al.* 2010). Within Europe, it was first recorded in Germany in 2006 (Kruger, 2008), possibly as a result of the importation of horticultural material, and has since quickly spread into adjacent countries. The European and Mediterranean Plant Protection Organization has received notification of its presence in over 25 countries, from Russia, Turkey and the Ukraine in the east, to France, Spain and Portugal in the west (EPPO, 2019).

In Spain, it was first reported from Galicia (Otero *et al.* 2014; Pérez & Pérez 2014), Cantabria and Cataluña (Dincă *et al.* 2017). Since then, it has been recorded on the website 'Biodiversidad Virtual', (Nadal, 2016), mainly in the northern provinces of Spain, e.g., Girona, Asturias and Barcelona in 2016, Guipuzcoa and Vizcaya in 2018. It was also recorded in

Resumen

Se registran por primera vez en Gibraltar las especies invasoras *Cydalima perspectalis* (Walker, 1859), una plaga del género *Buxus* L. y *Paysandisia archon* (Burmeister, 1880), una plaga de palmeras (Arecaceae). Informamos sobre el estatus actual de ambas especies en Gibraltar, así como los posibles efectos sobre la flora autóctona. *Paysandisia archon* afecta a las palmeras de *Chamaerops humilis* L. en zonas urbanas, y están en riesgo las del entorno natural. *Cydalima perspectalis* también se ha detectado en plantas de los géneros *Rubus*, *Ruscus*, *Acer* y *Fraxinus* en el este de Europa.

October 2017 from Pedreguer in the Jardines de l'Albarda, in Alicante. The species was recorded in central Spain, in the Real Jardín Botánico in Madrid in August and September 2018 (Gómez-Undiano *et al.* 2018). A male was also recorded from Malta on the 5th May 2018 (Aguis, 2018), following an importation of *Buxus* shrubs.

The South American Palm Borer *Paysandisia archon* is a moth of the Castniidae, a small family with fewer than 200 species that are mainly found in the Neotropical region, but also Australia and Southeast Asia (Drescher & Dufay 2002). The species was described by Herman Burmeister in 1880, as *Castnia archon*.

P. archon is a native of central Argentina, Uruguay, parts of Brazil and Paraguay, where it feeds on various palm species but mainly *Trithinax campestris* Burmeist, of which many have been exported from Argentina to Europe (Drescher & Dufay 2002).



Fig 1: The Boxwood Moth *Cydalima perspectalis* (Walker 1859). Male and female dark morph.

Fig 1: La polilla del boj *Cydalima perspectalis* (Walker 1859). Variedad oscura masculina y femenina.

Fig 2: The Palm Borer Moth *Paysandisia archon* (Burmeister, 1880), photographed in Gibraltar on 3rd August 2018.

Fig.2: La polilla barrenadora de las palmeras *Paysandisia archon* (Burmeister, 1880), fotografiada en Gibraltar el 3 de agosto de 2018.

The Palm Borer was first recorded in Europe with the importation of the exotic palms *Butia yatay* Becc, and *Trithrinax campestris* between 1992 and 1998. It was first reported from Catalonia, Spain, and then a few months later from France (Aguilar *et al.* 2001). It probably arrived in France around 1995 and was localised in the Department of Var, where it had been introduced with imported *Trithrinax* from Argentina. Its presence was not notified at that time, and the official record with accurate scientific identification was only registered in July 2001 (Drescher & Dufay 2001).

By 2004 the moth had been detected in southern Italy, but mainly in plant nurseries. In 2006, *Phoenix canariensis* Chaub, palms in the Province of Bari had been infected with the moth (Porcelli *et al.* 2005). At the end of 2006 it had had been detected in Greece (Vassarmidaki, 2006) and in the Netherlands (Reid & Moran, 2009). Since then it has been recorded from Cyprus, Croatia, Bulgaria and Russia, where over 200 palms perished in areas around Sochi on the Black Sea coast (Karpun, 2015). The species was confirmed from West Sussex, UK, in August 2002 (Patton & Perry, 2002). In May 2007, nine live adult *P. archon* moths were discovered in the atrium of an office building in Kent. The moths had emerged from four 5m-tall *Phoenix canariensis* imported from Spain in October 2006. The UK is currently seeking EU Protected Zone (PZ) status for this pest (Reid & Moran, 2009).

Material & Methods

Moth trapping has taken place at the Gibraltar Botanic Gardens on a nightly basis for the last twelve years, using a Rothamsted light trap with a 200w tungsten light. This effort is occasionally complemented with a Robinson light trap with a 125w mercury vapour light. The Rothamsted light trap records mainly micro moths, with very few large moths trapped. All the specimens of *Cydalima perspectalis* were captured in the Robinsons light trap, which is more effective for larger moths (e.g., Noctuidae, Erebidae and Geometridae).

Results

In Gibraltar, *Cydalima perspectalis* was first encountered at the Gibraltar Botanic Gardens, when a male was captured on the 22nd August 2018, followed by a second male on the 27th September 2018, then two males and a dark morph female on the 28th September 2018 in the Rothamsted trap (Fig.1). All the specimens were very fresh and it was assumed that they may have emerged close by. The specimens are deposited in the collection of the Gibraltar Ornithological & Natural History Society (GONHS).

An adult *Paysandisia archon* was photographed by Ms Kyra Gonzalez near the urban centre on the 3rd August 2018 (Fig. 2).

Discussion

The genus *Buxus* L. does not occur in the wild in Gibraltar and only a few bushes are present in the Gibraltar Botanic Gardens. A close inspection of these revealed no damage to the leaves and no presence of larvae. The species is also known to affect *Rubus* spp. in Georgia (Matsiakh, *et al.* 2018) and *Ruscus colchicus* Yeo, *R. aculeatus* L. *Eriobotrya japonica* (Thunb) Lindl, *Acer campestre* L. *Fraxinus excelsior* L. and *Rubus* spp. in Sochi (Trokhov, 2019). *Rubus ulmifolius* Schott is native to Gibraltar but is localised. Examination of *Rubus ulmifolius*, *Ruscus hypophyllus* L. and *Fraxinus angustifolia* Vahl will be carried out by the authors during 2019, to determine if the moth has affected native species.

The authors also carried out a survey of palms on the morning of the 7th August 2018, in the area where the moth was found. Fronds of *Phoenix* and *Washingtonia* in planted areas showed no signs of the moth, but planters containing several species of palms (Fig. 3) revealed the first signs of attack by caterpillars, on fronds of *Trachycarpus fortunei* H. Wendl, and *Chamaerops humilis* L. (Fig.4). A closer inspection of the stems and trunks of the palms revealed a mass of plant fibres and



Fig 3: External planter at office building with several palm species.

Fig 3: Jardinera externa en el edificio de oficinas con varias especies de palmeras.

Fig 4: *Paysandisia archon* caterpillar damage to Dwarf Fan Palm *Chamaerops humilis* frond.

Fig 4: Daños de la oruga de *Paysandisia archon* a la fronda del palmito *Chamaerops humilis*.

Fig 5: Cocoon with emergent empty chrysalis still attached.

Fig 5: Capullo con crisálida vacía aún adherida.

Fig 6: Top arrow showing caterpillar damage, bottom arrow empty chrysalis recently emerged.

Fig 6: Flecha superior que muestra el daño de la oruga, flecha inferior, crisálida vacía recientemente emergida.

dried, dark palm sap, along with the presence of cocoons with the chrysalis of the moth that had emerged still attached (Fig. 5). Several smaller *Chamaerops humilis* had been killed by the moth (Fig. 6). All specimens of this palm showed evidence of attack by the moth. The small holes in developed leaves (Fig. 4) indicate that infestation is not recent. It is likely that the moth had been introduced to Gibraltar when these palms were imported from plant nurseries in Spain.

This moth is a known invasive species from South America which is having a serious impact on palm species around the Mediterranean. It is currently listed in EC Directive 2000/29/EC as a II/III pest (<https://cordis-europa.eu/>) and on the EPPO A2 list of pests recommended for regulation as quarantine pests (<http://gd.eppo.int/>) and is a serious pest of palms established in parts of southern Europe. Numbers of *Phoenix canariensis* around Gibraltar have already been reduced substantially due to an invasion by the Red Palm Weevil *Rhynchophorus ferrugineus* (Olivier, 1790), and whilst a control programme is in place, palms around Gibraltar continue to be lost. Gibraltar now faces another serious pest that may impact these remaining *Phoenix canariensis*, as well as the native *Chamaerops humilis* and other ornamental palm species.

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