CAPS Datasheets provide pest-specific information to support planning and completing early detection surveys.

Paysandisia archon

Scientific Name
Paysandisia archon (Burmeister, 1880)

Synonyms:
Castnia archon Burmeister, 1879
Castnia josepha Oberthür, 1914

Common Names
South American palm borer, castniid palm borer, palm borer moth

Type of Pest
Moth, borer

Taxonomic Position
Class: Insecta, **Order**: Lepidoptera, **Family**: Castniidae

Figure 1. Adult *Paysandisia archon* female (top) and male (bottom). Source: Victor Sarto i Monteys, Servei de Proteccio dels Vegetals, Bugwood.org, licensed under CC BY-NC 3.0.

Pest Recognition
This section describes characteristics of the organism and symptoms that will help surveyors recognize possible infestations/infections in the field, select survey sites, and collect symptomatic material. For morphological descriptions, see the Identification/Diagnostic resources on the AMPS pest page on the CAPS Resource and Collaboration website.

Pest Description

Adults are large, fly by day moths with clubbed antennae, olive-brown forewings, and bright red, black, and white hindwings (Drescher and Dufay, 2002). They are easily mistaken for butterflies (Gilligan and Passoa, 2015). Females are slightly bigger than males. They have a long ovipositor and an average wingspan of 86 mm vs 75 mm (Figure 1) (Drescher and Dufay, 2002; Sarto i Monteys and Aguilar, 2005).

Eggs resemble rice grains, measuring about 4.7 mm ($^{3}/_{16}$ in) long with longitudinal ridges. When freshly laid, they deepen in color from creamy pink or tan to reddish-brown over several days; after the larvae emerges, broken shells appear dull white. Eggs are laid singly in the fibers of the palm trunk or where the leaf meets the trunk; they are well-hidden but not attached to the plant (Sarto i Monteys and Aguilar, 2005).

Newly hatched **larvae** are about 7.3 mm ($^{5}/_{16}$ in) long and 1 mm ($^{1}/_{16}$ in) at their widest. They are rose-colored with brown heads but fade to white within the first instar. After the first instar, larvae are ivory-white and much less mobile (Sarto i Monteys and Aguilar, 2005). Late-stage larvae reach 90 mm (3 $^{9}/_{16}$ in) long and 15 mm ($^{9}/_{16}$ in) wide (Figure 2) (Sarto i Monteys and Aguilar, 2005). Larvae are grub-like with four pairs of pseudopods (Drescher and Dufay, 2002). They avoid light and seek food and shelter as soon as they emerge, tunneling into their host within minutes and dropping down on silk threads to a better site if needed; this is likely the only time larvae will be visible outside the palm (Sarto i Monteys and Aguilar, 2005). The location of larval boring damage varies with the palm species, the instar, and the age of the plant (Kontodimas et al., 2017). Early instar larvae may tunnel into trunks, fruit, or leaf rachises, while the later, larger instars are more likely to bore into trunks (Sarto i Monteys and Aguilar, 2005).

Figure 2. Top: A later instar larva retreating into a gallery. Bottom: A pupa inside a cut cocoon. Source: Victor Sarto i Monteys, Servei de Proteccio dels Vegetals, Bugwood.org, licensed under CC BY-NC 3.0.

Prepupal larvae bore a tunnel to allow access to the outside of the palm and build a cocoon of palm fiber and silk in the resulting cavity (Sarto i Monteys and Aguilar, 2005). **Cocoons** are flat on one side and about 58 mm (2 $^{5}/_{16}$ in) long, varying from 17 mm ($^{11}/_{16}$ in) at the narrowest to the 19 mm ($^{3}/_{4}$ in) at the widest (Sarto i Monteys and Aguilar, 2005). They are located near or on the surface of the trunk or where the leaves meet the trunk and are typically camouflaged by the trunk's fibers (Figure 2) (Sarto i Monteys and Aguilar, 2005).

Signs

Larvae bore through palm trunks, creating galleries (Sarto i Monteys and Aguilar, 2005). Because they are hidden, infestations can be difficult to detect unless adults are present (Drescher and Dufay, 2002; Reid and Moran, 2007). Signs of infestation include any of the following: debris plugs or empty cocoons on the palm's surface or on the ground (Drescher and Dufay, 2002; Kontodimas et al., 2017), sawdust on the palm crown or trunk, perforations on leaves from feeding, galleries within the palm trunk, abnormally developed axillary buds, thick brown liquid oozing from the plant, trunk deformation, slow growth, and drying of the

plant, particularly the core leaves (Figure 3) (Kontodimas et al., 2017; Reid and Moran, 2007; Sarto i Monteys and Aguilar, 2005). However, palms may not show symptoms unless heavily infested (Vassiliou et al., 2009) or until they collapse (Kontodimas et al., 2017).

Figure 3. Signs of infestation in *Trachycarpus fortunei* (Chinese windmill palm). Left: Damaged palm. Center: Sawdust on trunk. Right: Pupal exuviae on trunk. Source: Victor Sarto i Monteys, Servei de Proteccio dels Vegetals, Bugwood.org, licensed under CC BY-NC 3.0.

Newly hatched larvae may tunnel into young, tightly packed palm fronds, resulting in visible damage as the fronds develop and expand. In *Phoenix* species and other pinnate-leaved palms, this causes scattered perforations in the leaves. In *Chamaerops humilis, Trachycarpus fortunei, Trithrinax campestris,* and *Washingtonia filifera*, the perforations appear in a circular arc (Figure 4).

Easily Mistaken Species

Because they fly during the day and have clubbed antennae, *P. archon* moths may be mistaken for butterflies. However, their large size and unique wing pattern and coloration distinguish them from other North American moths and butterflies (Gilligan and Passoa, 2015).

Paysandisia archon infestations cause some of the same symptoms as other pests and environmental conditions; these include abnormal crown growth and damaged, discolored, or dry leaves (Kontodimas et al., 2017). Red palm weevil (*Rhynchophorus ferrugineus*) damage, in particular, resembles that caused by *P. archon*. Leaf perforations can help distinguish which pest is causing the damage: *Paysandisia archon* perforates the fronds in an arc or circular shape (Figure 4), while red palm weevil perforations appear in more of a “>” shape (Kontodimas et al., 2017). When the species co-occur on the same plant, *P. archon* has been found around the base, in subterranean roots of small palms, and in the “peripheral zone” of the stipe of larger palms; red palm weevil has been found in

the upper parts of small palms and the central section of the stipe of larger palms (Kontodimas et al., 2017). Red palm weevil is not present in the United States, but the closely related South American palm weevil (*Rhynchophorus palmarum*) occurs in southern California where it causes similar damage (Hoddle, 2018).

Figure 4. Chinese windmill palm (*Trachycarpus fortunei*) fronds perforated by the larvae. Source: Victor Sarto i Monteys, Servei de Proteccio dels Vegetals, Bugwood.org, licensed under CC BY-NC 3.0.

Biology and Ecology

Literature that describes the life cycle and behavior of *P. archon* is almost exclusively based on observations and studies from the species' invasive range in the Mediterranean (France, Italy, and Spain). The moths fly in hot, sunny weather; it is between 71.6-104 °F for males and for females, it is at 77-86 °F when relative humidity is below 32 percent and winds are low (Liégeois et al., 2016). Males tend to patrol their territory by flying over the same areas before returning to the same spot to land (Sarto i Monteys and Aguilar, 2005). Adults fly from mid-May to mid-October, but typically peak in June and July (Drescher and Dufay, 2002; Sarto i Monteys and Aguilar, 2005). The moths have a proboscis (mouthpart) but do not feed (Sarto i Monteys and Aguilar, 2005). After mating, females lay eggs singly in the fibers of the palm trunk or where the leaf meets the trunk (Sarto i Monteys and Aguilar, 2005). They may lay up to ten eggs near each other (Hamidi and Frérot, 2016) and up to 140 eggs total (Sarto i Monteys and Aguilar, 2005). Eggs are found in late May to mid-October (Sarto i Monteys and Aguilar, 2005).

Eggs hatch in 12 to 21 days, depending on the temperature (Sarto i Monteys and Aguilar, 2005). Larvae, typically, go through nine instars (Sarto i Monteys and Aguilar, 2005). The life cycle of this moth is usually annual but can be biannual if larvae hatch in autumn. Depending on when they hatch, individuals can spend 10 or 18 months as larvae (Muñoz-Adalia and Colinas, 2020; Sarto i Monteys and Aguilar, 2005). Larvae feed inside the trunk, but the first instar may briefly feed on the outside of the trunk (Sarto i Monteys, 2002).

Late-stage larvae bore a tunnel to the outside of the palm and build a cocoon of palm fiber and silk near or on the trunk's surface or where the leaves meet the trunk (Sarto i Monteys and Aguilar, 2005). Adult moths typically emerge from these cocoons in the late morning or early afternoon. They climb onto vertical surfaces and fly within an hour or two (Sarto i Monteys and Aguilar, 2005). In late summer and early autumn, all life stages may be present (Closa et al., 2017). All

larval stages can be found in palms during winter (Sarto i Monteys and Aguilar, 2005).

For an extensive account of the moth's biology, see Sarto i Monteys and Aguilar (2005).

Known Hosts

Larvae feed on a wide variety of palms (Arecaceae) (Sarto i Monteys and Aguilar, 2005), including young palms in nurseries and mature palms in landscapes and gardens (Núñez Vázquez, 2013; Porcelli et al., 2006). In Europe, where *P. archon* is invasive, it attacks *C. humilis*, *Phoenix canariensis*, and *T. fortunei* most frequently (Andre and Malicorne, 2013; Beaudoin-Ollivier et al., 2017). These species, along with *Washingtonia filifera* and *W. robusta*, are considered to be susceptible to *P. archon* (Isidoro et al., 2017). However, the moth rarely attacks *Washingtonia* species even when they are abundant (Andre and Malicorne, 2013; De La Torre Manca et al., 2014; personal communication, Sarto i Monteys, 2019). Also, *P. archon* is not typically considered to be a significant pest in South America (Isidoro et al., 2017), but it does attack ornamental palms, particularly *P. canariensis* and *Trithrinax campestris*, in urban areas (De La Torre Manca et al., 2014).

The host list, below, includes cultivated and wild plants that 1) are infected or infested by the pest under natural conditions, 2) are frequently described as major, primary, or preferred hosts, and 3) have documented primary evidence for feeding and damage. Commercially produced plants and pests that cause significant economic damage are highlighted in bold.

Frequent Hosts

Butia capitata[*†] (jelly palm), *B. yatay* (yatay palm), ***Chamaerops humilis***[†] (dwarf fan palm), ***Phoenix canariensis***[*†] (Canary Island date palm), *P. dactylifera*[*†] (date palm), *Sabal palmetto*[*†] (cabbage palmetto), ***Trachycarpus fortunei***[†] (=*T. wagnerianus*) (Chinese windmill palm), and ***Trithrinax campestris***[†] (thatch palm) (De La Torre Manca et al., 2014; Drescher and Jaubert, 2003; Isidoro et al., 2017; Pintaud and Castellana, 2017; Sarto i Monteys and Aguilar, 2005).

Infrequent Hosts

Acoelorrhaphe wrightii[*†] (Everglades palm), *Arenga engleri*[†] (Formosan sugar palm), *Brahea aculeata*[†] (Sinaloa hesper palm), *B. armata*[†] (blue fan palm), *B. dulcis*[†] (blue rock palm), *B. edulis* (Guadeloupe palm), *Howea forsteriana*[†] (sentry palm), *Jubaea chilensis*[†] (Chilean coco palm), *Livistona* spp., *L. australis*[†] (cabbage palm), *L. chinensis*[*†] (Chinese fan palm), *L. decora*[†] (=*L. decipiens*) (ribbon fan palm), *L. saribus*[†] (serdang palm), *Nannorrhops ritchieana*[†]

[*] Hosts with native or naturalized populations in the United States (Kartesz, 2021; USDA NRCS, 2021).
[†] Hosts grown as ornamental or landscaping plants in the United States (Floridata, 2022; Stein, 2017).

(=*Nannorrhops arabica*) (Mazari palm), *Phoenix* spp.* (date palm), *P. reclinata**† (Senegal date palm), *P. roebelenii*† (miniature date palm), *P. sylvestris*† (date sugar palm), *P. theophrasti* (Cretan date palm), *Sabal* spp.* (palmetto), *S. bermudana**† (Bermuda palm), *S. mauritiiformis*† (Trinidad palm), *S. mexicana**† (Mexican palmetto), *S. minor**† (dwarf palmetto), *Serenoa repens** (saw palmetto), *Syagrus romanzoffiana**† (queen palm), *Trachycarpus* spp., *Trithrinax brasiliensis*† (=*T. acanthocoma*) (Brazilian needle palm), *Washingtonia** spp. (fan palm), *W. filifera**† (California fan palm), and *W. robusta**† (Mexican fan palm) (Andre and Malicorne, 2013; De La Torre Manca et al., 2014; Drescher and Jaubert, 2003; Isidoro et al., 2017; Niamouris and Psirofonia, 2012; Pintaud and Castellana, 2017; Sarto i Monteys and Aguilar, 2005).

Pest Importance

Paysandisia archon is a significant pest in its introduced range, particularly in France, Italy, and Spain (Beaudoin-Ollivier et al., 2017). Between 2002 and 2012, it killed up to 90 percent of the *T. fortunei* palms in parts of France's Languedoc-Roussillon region. It also killed up to 75 percent of *C. humilis* palms in some areas and destroyed many *P. canariensis* palms (Andre and Malicorne, 2013). In 2003, it attacked several nurseries in Italy, sometimes killing 90 percent of the palms (Sarto i Monteys and Aguilar, 2005). In Spain, this moth attacked *P. canariensis* and *C. humilis* in palm nurseries as early as the 1990s and had attacked wild *C. humilis* (Sarto i Monteys and Aguilar, 2005).

In its native South America, where natural enemies and declining habitat are thought to keep populations low (Drescher and Dufay, 2002), *P. archon* is rarely a damaging pest (Beaudoin-Ollivier et al., 2017; Drescher and Dufay, 2002; Sarto i Monteys and Aguilar, 2005). However, in the late 1920s, a sudden outbreak in Uruguay killed many mature exotic palms (Bourquin, 1933; Sarto i Monteys and Aguilar, 2005). It is now so rare in Uruguay that no control measures are taken against it (Sarto i Monteys and Aguilar, 2005). *Paysandisia archon* is not a pest in Argentina where it is native (Sarto i Monteys and Aguilar, 2005), but it has become a problem in cities such as Buenos Aires and Córdoba with the introduction of exotic ornamental palms (De La Torre Manca et al., 2014; Sarto i Monteys and Aguilar, 2005).

In 2019, twenty U.S. states grew landscaping palms commercially, with total sales valued at $132.6 million (USDA NASS, 2020). Two years earlier, five states had grown dates commercially with most of the production in California (USDA NASS, 2019). The gross value of California dates produced from 12,200 acres was $107.6 million in 2020 (CDFA, 2022). However, economic losses or impact as a result of *P. archon* on dates has not been reported.

The European and Mediterranean Plant Protection Organization recommends regulation over *P. archon* as a quarantine pest, in member countries where it is not present (EPPO, 2021a). Chile, the European Union, Guatemala, Japan, Monaco, Morocco, North Macedonia, San Marino, Serbia, Turkey, the United

Kingdom, and the Vatican City State consider it to be a harmful organism (PExD, 2022). Trade with these countries and regions could be impacted if the palm borer establishes in the United States.

Pathogens or Associated Organisms Vectored

Paysandisia archon does not transmit any pathogens or other organisms. However, larval boring can lead to secondary fungal infections (Frigimelica et al., 2012; Sarto i Monteys and Aguilar, 2005) or create favorable reproduction sites for other palm pests such as the red palm weevil (Beaudoin-Ollivier et al., 2017).

Known Distribution

Paysandisia archon is native to **South America**: Argentina (northeast, central), Brazil (Rio Grande do Sul), Paraguay (Paraguayan Chaco), and Uruguay (west) (De La Torre Manca et al., 2014; Sarto i Monteys and Aguilar, 2005).

In **Europe**, it has been introduced to Crimea, Croatia, Cyprus, France, Georgia, Gibraltar, Greece (including Crete), Italy (including Sicily), Russia, Slovenia, and Spain (including the Balearic Islands) (Colazza et al., 2005; Coutsis, 2012; Dbar et al., 2021; EPPO, 2021b; Karpun et al., 2015; Luquet, 2016; Masten-Milek and Šimala, 2012; Perez and Guillem, 2019; Sarto i Monteys et al., 2005; Sharmagiy et al., 2021; Vassarmidaki et al., 2005; Vassiliou et al., 2009).

Paysandisia archon has been eradicated from the Czech Republic, Denmark, Germany, Switzerland, and the United Kingdom (England, Northern Ireland) (EFSA Panel on Plant Health, 2014; EPPO, 2021b). It is considered absent in Belgium since it has not been found in surveys subsequent to a detection in the early 2010's (EPPO, 2021b). In Bulgaria, it has been described as established (Sarto i Monteys, 2013) and transient or under eradication (EFSA Panel on Plant Health, 2014). Other than a single record in Bolivia in 1954 (Rodríguez-Ramírez et al., 2020) and an unconfirmed record of the species in Portugal in 2011 (EPPO, 2021b), nothing recent suggests that it is present in either country.

Pathway

Paysandisia archon larvae are difficult to detect in palm trunks (Isidoro et al., 2017), which facilities long-distance spread through the importation of infested palms. The species was likely introduced into Spain and France as larvae in palms imported from Argentina, such as *Butia yatay* and *Trithrinax campestris* (Sarto i Monteys and Aguilar, 2005). New detections in Europe can typically be traced back to palms imported from other European countries where the moth is present (e.g., EPPO, 2011, 2020; Perez and Guillem, 2019; Reid and Moran, 2007; Vassiliou et al., 2009).

Paysandisia archon adults probably spread locally by flying. They are strong fliers that have been found in mature palms as far as 30 km from infested nurseries (Sarto i Monteys and Aguilar, 2005). In one study, male moths stayed within a 4-hectare area, making short flights of no more than 224 meters to patrol

their territory, but most female moths immediately flew more than 500 meters out of the 30-hectare study area (Liégeois et al., 2016).

Use the PPQ Commodity Import and Export manuals listed below to determine 1) if host plants or material are allowed to enter the United States from countries where the organism is present and 2) what phytosanitary measures (e.g., inspections, phytosanitary certificates, post entry quarantines, mandatory treatments) are in use. These manuals are updated regularly.

Fruits and Vegetables Import Requirements (FAVIR) Online Database: The FAVIR database lists all import requirements for fruits and vegetables. To search by commodity, select 'Approved Name' at the top left of the page. Select the commodity from the drop-down menu and then click 'Search'. Click on the 'Commodity Summary' tab for details.
https://epermits.aphis.usda.gov/manual/index.cfm?action=pubHome

Plants for Planting Manual: This manual is a resource for regulating imported plants or plant parts for propagation, including buds, bulbs, corms, cuttings, layers, pollen, scions, seeds, tissue, tubers, and like structures.
https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/plants_for_planting.pdf

Cut Flowers and Greenery Import Manual: This manual is a resource for regulating imported fresh, cut plants used for decoration and for protecting plants from extinction due to trade.
https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/cut_flower_imports.pdf

Miscellaneous and Processed Products Import Manual: This manual is a resource for regulating imported processed plant and non-plant that may introduce exotic pests.
https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/miscellaneous.pdf

Treatment Manual: This manual provides information about treatments applied to imported and domestic commodities to limit the movement of agricultural pests into or within the United States.
https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf

Potential Distribution within the United States

We compared the species' distribution (GBIF, 2021) to a map of Global Plant Hardiness Zones (Takeuchi et al., 2018) and found reports of its presence in Zones 7-11. These Zones correspond to the coastal, southeastern, south central, and southwestern continental United States, as well as parts of Hawaii and Puerto Rico. Palms are native to or naturalized in all of these areas (Kartesz,

2021). *Paysandisia archon* could likely establish in areas of the United States within Zones 7-11 where host material is present. However, it could also survive in areas outside of these zones where palms are grown under protected conditions.

Areas with high densities of palms, such as nurseries or orchards, will likely be at a higher risk, including Florida, California, Texas, and Hawaii, which produce the majority of landscaping palms (USDA NASS, 2020).

Survey and Key Diagnostics

Approved Methods for Pest Surveillance:

For the current approved methods and guidance for survey and identification, see Approved Methods for Pest Surveillance (AMPS) pest page on the CAPS Resource and Collaboration website, at https://caps.ceris.purdue.edu/approved-methods.

References

Andre, N., and P. T. Malicorne. 2013. The Castniid palm borer in Languedoc-Roussillon: Impact, consequences and action plans. Proceedings of the 3rd Conference on Maintenance of Amenities Area, Toulouse, France. 13 pp.

Beaudoin-Ollivier, L., N. Isidoro, J. A. Jaques, P. Riolo, M. Kamal, and D. Rochat. 2017. Some Representative Palm Pests: Ecological and Practical Data. Pages 1-38 *in* V. Soroker and S. Colazza, (eds.). Handbook of Major Palm Pests. John Wiley & Sons.

Bourquin, F. 1933. Notas biológicas de la *Castnia archon* Burm. Revista de la Sociedad Entomológica Argentina 24(5):295–298.

CDFA. 2022. California County Agricultural Commissioners' Reports, Crop Year 2019-2020. California Department of Food and Agriculture (CDFA), Sacramento, CA. 71 pp.

Closa, S., L. Núñez, D. Gallego, A. Traveset, D. Alomar, and A. Lazaro. 2017. Dificultades en el control del insecto lepidóptero *Paysandisia archon* (Bursmeister, 1880) (Lepidoptera, Castniidae) sobre los palmitos (*Chamaerops humilis*) en las Islas Baleares. 7º Congreso Forestal Español, Plasencia, Spain. 7 pp.

Colazza, S., S. Privitera, G. Campo, E. Peri, and P. Riolo. 2005. *Paysandisia archon* (Lepidoptera, Castniidae) a new record for Sicily [abstract]. Informatore Fitopatologico 55(5):56-57.

Coutsis, J. G. 2012. *Paysandisia archon*, new to Páros Island, Greece (Lepidoptera: Castniidae). Phegea 40(1):25-26.

Dbar, R., M. Kiriya, and N. Romanova. 2021. New data on the monitoring of dangerous invasive insect species in Abkhazia. BIO Web of Conferences 35:00012.

De La Torre Manca, S. J., M. T. Defagó, and A. Salvo. 2014. Insectos fitófagos asociados a palmeras en la ciudad de Córdoba, Argentina. Revista de la Sociedad Entomológica Argentina 73(3-4):145-154.

Drescher, J., and A. Dufay. 2002. Importation of mature palms: A threat to native and exotic palms in Mediterranean countries? Palms (formerly Principes), Journal of the International Palm Society 46(4):179-184.
Drescher, J., and R. Jaubert. 2003. *Paysandisia archon* continues its progression. PHM Revue Horticole (445):49-51.
EFSA Panel on Plant Health. 2014. Scientific opinion on the pest categorisation of *Paysandisia archon* (Burmeister). EFSA (European Food Safety Authority) Journal 12(7):1-30.
EPPO. 2011. First report of *Paysandisia archon* in the Czech Republic. EPPO Reporting Service 2011(6):6-7.
EPPO. 2020. Eradication of *Paysandisia archon* from Switzerland. EPPO Reporting Service 2020(6):13-13.
EPPO. 2021a. EPPO A2 List of pests recommended for regulation as quarantine pests. European and Mediterranean Plant Protection Organization (EPPO). https://www.eppo.int/ACTIVITIES/plant_quarantine/A2_list.
EPPO. 2021b. EPPO Global Database. European and Mediterranean Plant Protection Organization (EPPO). http://gd.eppo.int.
Floridata. 2022. Master Plant List. Floridata. https://floridata.com/plants/all.
Frigimelica, G., A. Pozzebon, C. Duso, and G. Pellizzari. 2012. Pathogenic fungi on *Trachycarpus fortunei* palms infested by *Paysandisia archon*. Journal of Plant Pathology 94(4S):47-47.
GBIF. 2021. GBIF Occurrence Download (*Paysandisia archon*). Global Biodiversity Information Facility (GBIF). https://doi.org/10.15468/dl.3t9dqv.
Gilligan, T. M., and S. C. Passoa. 2015. Screening aid: South American palm borer, *Paysandisia archon* (Burmeister). United States Department of Agriculture, Animal and Plant Health Inspection Program, Plant Protection and Quarantine, Science and Techonology Identification Technology Program, Fort Collins, CO. 4 pp.
Hamidi, R., and B. Frérot. 2016. Oviposition behaviour in *Paysandisia archon* (Lepidoptera: Castniidae). Annales de la Société Entomologique de France (NS) 52(3):167-170.
Hoddle, M. 2018. Biology and Management of South American palm weevil, *Rhynchophorus palmarum* (L.) (Coleoptera: Cuculionidae), in California. University of California, Riverside. https://biocontrol.ucr.edu/south_american_palm_weevil.html.
Isidoro, N., P. Riolo, E. Verdolini, E. Peri, and L. Beaudoin-Ollivier. 2017. *Paysandisia archon*: Taxonomy, Distribution, Biology, and Life Cycle. Pages 131-149 *in* V. Soroker and S. Colazza, (eds.). Handbook of Major Palm Pests. John Wiley & Sons.
Karpun, N. N., Y. A. Ignatova, and E. N. Zhuravleva. 2015. Species of pests on ornamental woody plants in humid subtropics new for Krasnodar Kray (Russia). Izvestia Sankt Peterburgskoj Lesotehniceskoj Akademii 211:189-203.
Kartesz, J. T. 2021. The Biota of North America Program (BONAP). Taxonomic Data Center. http://www.bonap.net/tdc/.

Kontodimas, D., V. Soroker, C. Pontikakos, P. Suma, L. Beaudoin-Ollivier, F. Karamaouna, and P. Riolo. 2017. Visual identification and characterization of *Rhynchophorus ferrugineus* and *Paysandisia archon* infestation. Pages 187-208 *in* V. Soroker and S. Colazza, (eds.). Handbook of Major Palm Pests. John Wiley & Sons.

Liégeois, M., P. Tixier, and L. Beaudoin-Ollivier. 2016. Use of radio telemetry for studying flight movements of *Paysandisia archon* (Lepidoptera: Castniidae). Journal of Insect Behavior 29(2):199-213.

Luquet, G. C. 2016. *Paysandisia archon* (Burmeister, 1880), espèce nouvelle pour le département du Lot-et-Garonne (Lepidoptera Castniidae). Alexanor 27(7):478-480.

Masten-Milek, T., and M. Šimala. 2012. Prvi nalaz palminog drvotoča - *Paysandisia archon* (Burmeister, 1880) u Hrvatskoj. Glasilo biljne zaštite 12(3):211-219.

Muñoz-Adalia, E. J., and C. Colinas. 2020. The invasive moth *Paysandisia archon* in Europe: Biology and control options. Journal of Applied Entomology 144:341-350.

Niamouris, K., and P. Psirofonia. 2012. First report of *Paysandisia archon* on *Phoenix theophrasti*. Entomologia Hellenica 21(2):74-76.

Núñez Vázquez, L. 2013. Evolución del ataque de la *Paysandisia archon* (Bursmeister, 1880) sobre los palmitos (*Chamaerops humilis*) de las Islas Baleares. 6º Congreso Forestal Español, 10-14 June 2013, Vitoria-Gasteiz.

Perez, C. E., and R. M. Guillem. 2019. First records of the pest species *Cydalima perspectalis* (Walker, 1859) and *Paysandisia archon* (Burmeister, 1880) in Gibraltar (Lepidoptera: Crambidae & Castniidae). Revista de la Sociedad Gaditana de Historia Natural 13:15-18.

PExD. 2022. Phytosanitary Exports Database (PExD). United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine. https://pcit.aphis.usda.gov/pcit/faces/signIn.jsf.

Pintaud, J.-C., and R. Castellana. 2017. *Paysandisia:* Menaces sur la biodiversite Mediterraneenne & lutte integree contre les ravageurs des palmiers. Project Phoenix: Ecologie du genre *Phoenix* (Arecacees). http://www.listephoenix.com/?page_id=9680.

Porcelli, F., R. Monfreda, M. S. Ricci, N. Stingi, C. Cavallo, and G. Pellizzari. 2006. *Paysandisia archon* (Burmeister, 1880) escapes from nurseries and colonizes large palms in South Italy. European and Mediterranean Plant Protection Organization. https://www.eppo.int/ACTIVITIES/plant_quarantine/shortnotes_qps/paysandisia_archon.

Reid, S., and H. Moran. 2007. Plant Pest Notice: Palm Borer, *Paysandisia archon*. Department for Environment, Food and Rural Affairs, Central Science Laboratory, York, UK. 4 pp.

Rodríguez-Ramírez, J. V., S. D. Ríos, S. S. Moraes, F. C. Penco, and J. M. González. 2020. Catálogo de los Castniidae (Lepidoptera) del Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires:

descripción de tipos y notas generales e históricas. Revista del Museo Argentino de Ciencias Naturales 22(2):173-190.
Sarto i Monteys, V. 2002. The discovery, description and taxonomy of *Paysandisia archon* (Burmeister, 1880), a castniid species recently found in south-western Europe (Castniidae). Nota Lepidopterolgica 25(1):3-15.
Sarto i Monteys, V. 2013. *Paysandisia archon* (Castniidae): description, biological cycle, behaviour, host plants, symptoms and damages. AFPP – Palm Pest Mediterranean Conference, Nice, France. January 16-18, 2013.
Sarto i Monteys, V. 2019. Re: *Paysandisia archon* Survey Methods. Personal communication to P. T. Hertl on February 26, 2019, from Victor Sarto i Monteys (Ministry of Agriculture, Livestock, Fisheries and Food, Catalonian Government- Service of Plant Health) providing current information about pheromones and survey techniques.
Sarto i Monteys, V., and L. Aguilar. 2005. The Castniid palm borer, *Paysandisia archon* (Burmeister, 1880), in Europe: Comparative biology, pest status and possible control methods (Lepidoptera: Castniidae). Nachrichten des Entomologischen Vereins Apollo 26(1/2):61-94.
Sarto i Monteys, V., L. Aguilar, M. Saiz-Ardanaz, D. Ventura, and M. Marti. 2005. Comparative morphology of the egg of the castniid palm borer, *Paysandisia archon* (Burmeister, 1880) (Lepidoptera: Castniidae). Systematics and Biodiversity 3(2):179-201.
Sharmagiy, A. K., E. B. Balykina, N. N. Trikoz, D. A. Korzh, and E. V. Yatskova. 2021. Dynamics of phytophage invasions and peculiarities of their phenology in the parks of the south coast of the Crimea. E3S Web of Conferences 254(06005):1-8.
Stein, G. 2017. Palms for Southern California. PalmPedia. http://www.palmpedia.net/palmsforcal/Main_Page.
Takeuchi, Y., G. Fowler, and A. Joseph. 2018. SAFARIS: Global Plant Hardiness Zone Development. North Carolina State University, Center for Integrated Pest Management; United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Science and Technology, Plant Epidemiology and Risk Analysis Laboratory. https://safaris.cipm.info/safarispestmodel/StartupServlet?phz.
USDA NASS. 2019. 2017 Census of Agriculture. United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). 711 pp.
USDA NASS. 2020. 2019 Census of Horticultural Specialties. United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS), Washington, D.C. 543 pp.
USDA NRCS. 2021. The PLANTS Database. United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS). http://plants.usda.gov/.
Vassarmidaki, M., N. Thymakis, and D. C. Kontodimas. 2005. First record in Greece of the palm tree pest *Paysandisia archon*. Entomologia Hellenica 16:44-47.

Vassiliou, V. A., C. Michael, E. Kazantzis, and A. Melifronidou-Pantelidou. 2009. First report of the palm borer *Paysandisia archon* (Burmeister 1880) (Lepidoptera: Castniidae) in Cyprus. Phytoparasitica 37:327-329.

USDA-APHIS-PPQ-S&T staff developed this datasheet. Cite this document as:

PPQ. 2022. Cooperative Agricultural Pest Survey (CAPS) Pest Datasheet for *Paysandisia archon* (Castniidae): South American palm borer. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (PPQ), Raleigh, NC.

Versions

August 2011: Datasheet completed (Version 1)
June 2022: Datasheet fully revised (Version 2)

Reviewer(s)

Dr. Todd Gilligan, USDA-APHIS-PPQ-S&T Pest Identification Technology Laboratory, Fort Collins, CO.