

Diagnosics

Diagnostic

Paysandisia archon

Specific scope

This standard describes a diagnostic protocol for *Paysandisia archon*¹.

Specific approval and amendment

Approved in 2011-09.

Introduction

Paysandisia archon originates from South America and has been introduced into Europe with imported palms. It is present in Cyprus, France, Greece (Crete island), Italy, Spain, Slovenia² and Switzerland. It belongs to the Castniidae, a small family of Lepidoptera, with almost 200 species. The family is divided into two subfamilies: the Castniinae which includes Neotropical and Australian species; and the Tasciniinae which includes South-East Asian species. Larvae of *P. archon* are stem borers of palms. Further information on its host range, geographical distribution and biology can be found in the EPPO data sheet on *P. archon* (EPPO, 2008) and in Sarto i Monteys & Aguilar (2005).

Identity

Name: *Paysandisia archon* (Burmeister, 1880)

Synonyms: *Castnia josepha* Oberthür

Taxonomic position: Insecta: Lepidoptera: Castniidae

EPPO code: PAYSAR

Phytosanitary categorization: EPPO A2 list No. 338, EU Annex designation Annex II/A2.

Detection

Paysandisia archon can be detected based on several symptoms including the presence of sawdust on the palm crown and/or palm trunk; the presence of perforated or nibbled leaves (non-

specific); the presence of gallery holes (axial and transversal) within the palm trunk (which can be seen when the palm trunk is cut into slices); the abnormal development of axillary leaf buds; the deformation and abnormal twisting of palm trunks; and the abnormal drying up of palms, especially the core leaves (Sarto i Monteys & Aguilar, 2005).

Identification

For diagnosis of Castniid adults see Appendices 1–3; for larval diagnosis see Appendix 4.

Adult

Paysandisia archon adults have brown forewings with light greenish reflections and a median dark band³, whereas the hindwings are orange-red and narrowly marginated with black, with a transverse black band containing five or six white cells. Their antennae are clubbed with an apical hook. Male wingspan ranges from 6.2 to 8.6 cm, female wingspan ranges from 6.8 to 9.8 cm. There is a subtle sexual dimorphism. Females have a long telescopic ovipositor (1.5–2 cm long when fully exerted), their wing-coupling is mediated through six to nine long and fine frenular bristles (males have only one long and stout frenular bristle) (Fig. 1), the dorsal part of their abdomen clearly shows six anatomical segments (as opposed to seven in males), and they are generally bigger than males (Fig. 2).

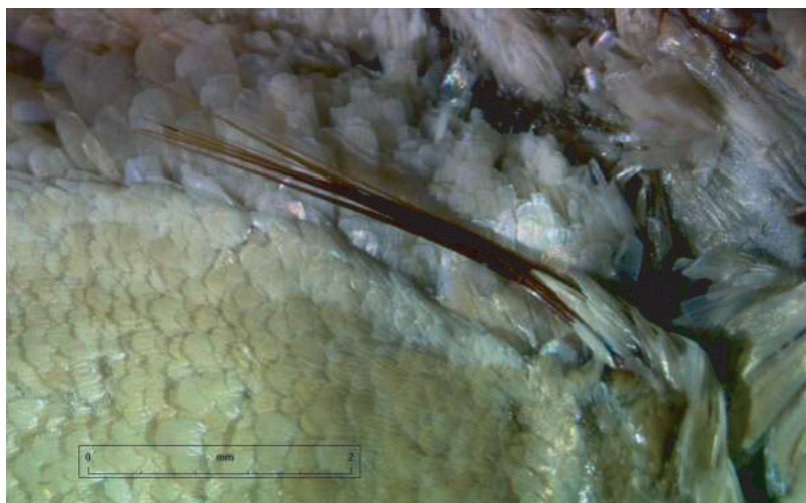
Eggs

Fusiform, looking like a rice grain, bearing six to eight raised, longitudinal ridges which have associated aeropyles along their

¹Use of brand names of chemicals or equipment in these EPPO Standards implies no approval of them to the exclusion of others that may also be suitable.

²*Paysandisia archon* is declared under transient, actionable, under eradication by the Slovenian NPPO (2010-10-13).

³May appear as two bands on photos.



Female wing-coupling system (six to nine long and fine frenular bristles)



Male wing-coupling system (one long and stout frenular bristle)

Fig. 1 Male and female wing-coupling systems.

length, with the micropyle at one end of the long axis. Freshly laid eggs are creamy pink or light brown, becoming rosy brown after a few days. The egg shell of hatched eggs appears dull white when seen on the fibre meshes of palms (Fig. 3A,B). Length: 4.69 ± 0.37 mm ($n = 163$), width: 1.56 ± 0.11 mm ($n = 118$). A complete description can be found in Sarto i Montey's *et al.*, 2005.

Larvae

Large size (6–7 cm for last instar larvae, max 9 cm), thoracic legs present, small size, colour whitish except cephalic capsule, pronotum and last abdominal segment brownish. Dorsal part of the body and ventral part of the abdominal segments with spines (Fig. 4).

Cocoon

Quite stout with the inner walls smoothly coated by a layer of silk and mucus and outer walls roughly covered by fragments of palm fibres which make it very cryptic. Cocoon is fusiform with an average length of 5.8 cm (range 5.2–7.4 cm) (Fig. 5).

Pupa

Colour brown-yellowish, length almost 5.5 cm. Most of the abdominal segments of the pupae are furnished with two transverse rows of short spines pointing backwards on the dorsal side. The anterior row is stronger than the posterior one (Fig. 6).

Paysandisia archon (Burmeister)



Adult female
Wingspan: 6.8 to 9.8 mm



Adult male
Wingspan: 6.2 to 8.6 cm

Fig. 2 *Paysandisia archon* adults, female and male.

Reference material

ANSES Plant Health Laboratory (LSV) – Entomology and Invasive Plants Unit Montpellier, CBGP, Campus International de Baillarguet, CS 30016, 34988 Montferrier-sur-Lez Cedex (FR).

Reporting and documentation

Guidelines on reporting and documentation are given in EPPO Standard PM 7/77 (1) *Documentation and reporting on a diagnosis*.

Further information

Further information on this organism can be obtained from:

J-F Germain, ANSES Plant Health Laboratory (LSV) – Entomology and Invasive Plants Unit Montpellier, CBGP, Campus International de Baillarguet, CS 30016, 34988 Montferrier-sur-Lez Cedex, France, E-mail: jean-francois.germain@anses.fr.

Acknowledgements

This protocol was originally drafted by J-F Germain, Anses-Laboratoire de la Santé des Végétaux, Montferrier-sur-Lez (FR).

Feedback on this Diagnostic Protocol

If you have any feedback concerning this Diagnostic Protocol, or any of the tests included, or if you can provide

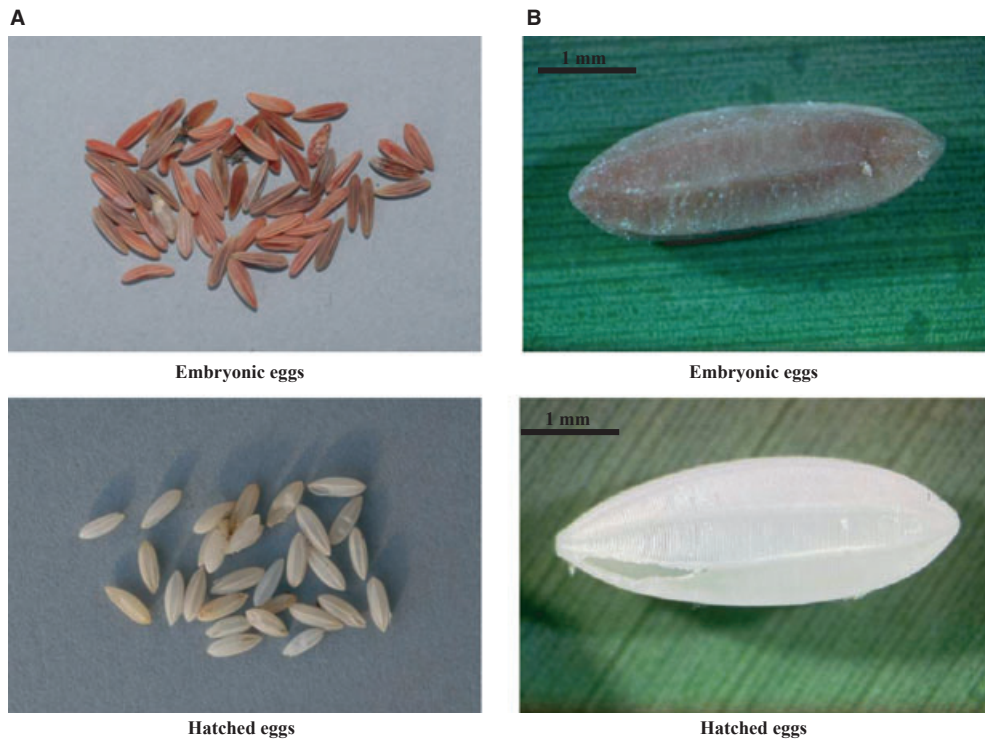


Fig. 3 *Paysandisia archon* eggs.

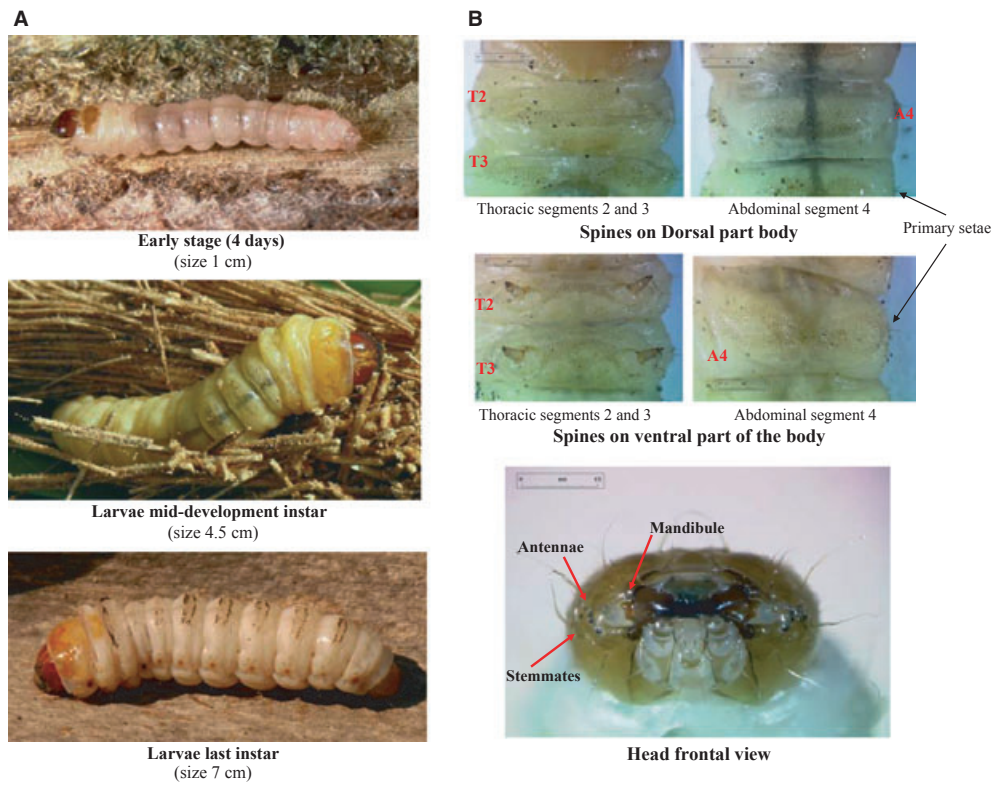


Fig. 4 *Paysandisia archon* larvae.

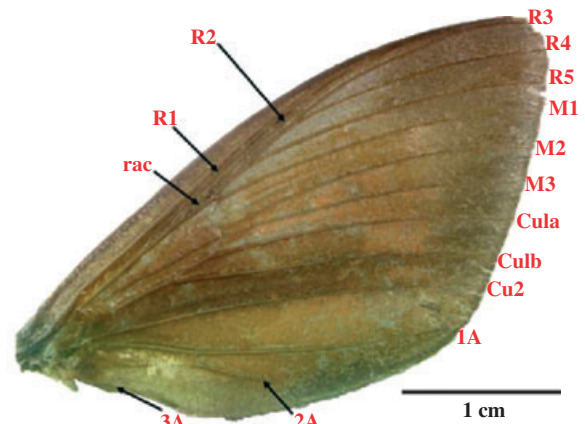


Fig. 5 *Paysandisia archon* cocoon.

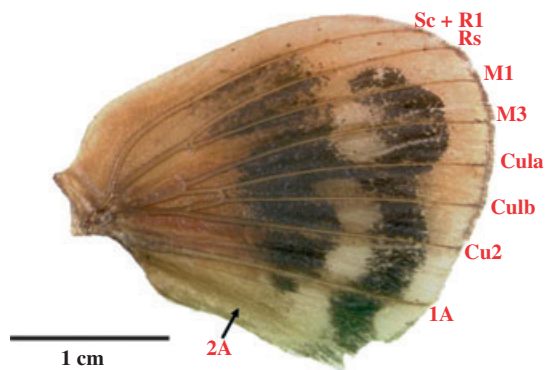


Fig. 6 *Paysandisia archon* pupae.

additional validation data for tests included in this protocol that you wish to share, please contact diagnostics@eppo.fr.



Forewing venation, ventral view



Hindwing venation, ventral view

Fig. 7 *Paysandisia archon* wing venation.

References

- Delvare G & Aberlenc HP (1989). *Les insectes d'Afrique de d'Amérique tropicale. Clés pour la reconnaissance des familles*. Prifas-Cirad, Montpellier, (FR), 302 p. (in French)
- EPPO (2008). Datasheets on quarantine pests. *Paysandisia archon*. *Bulletin OEPP/EPPO Bulletin* **38**, 163–166.
- Gordh G & Headrick DH (2001). *A Dictionary of Entomology*. CABI Publishing, Wallingford (GB), 1032 p.
- Miller JY 1986. *The Taxonomy, Phylogeny, and Zoogeography of the Neotropical Moth Subfamily Castniinae (Lepidoptera: Castnioidea: Castniidae)*. PhD dissertation, University of Florida, Gainesville, 571 p.
- Sarto i Monteys V & Aguilar L (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, N.F.* **26**, 61–94.
- Sarto i Monteys V, Saiz-Ardamaz M, Ventura D & Marti M (2005) Comparative morphology of the egg of the castniid palm borer, *Paysandisia archon* (Burmeister, 1880) (Lepidoptera: Castniidae). *Systematics and Biodiversity* **3**, 179–201.
- Stehr F (1987). *Immature Insects*, Vol. 1. Dubuque, Iowa: Kendal/Hunt, 757 p.

Appendix 1 – (adults)

Characters of the family Castniidae (after Delvare & Aberlenc, 1989):

- wings complete, not divided in lobes

- venation of hindwings reduced compared with that of forewings; frenulum present; jugum always absent in forewings
- hindwings with an obvious frenulum, constituted by a cluster of setae
- no thoracic tympanal organ
- base of abdomen without tympanal organ
- never ocelli or chaetosoma present together; one or other absent or few developed
- median vein present inside the discal cell, at least in the forewings, often in fore- and hindwings
- chaetosoma absent; labial palps developed
- antennae clubbed; large size butterflies.

Appendix 2 – (adults)

Key to the subfamilies, tribes and subtribes of Castniidae (after Miller, 1986)

1 Forewing, radial accessory cell absent, R1, R2 and R3 connate basal; R4 and R5 connate basad, origin R4 from R5 distal three-fourths wing; 3A absent; hindwing, secondary accessory cell reduced; antennal apiculus elongate; Malaysia, Indonesia	Tasciniinae, Tasciniini
1' Forewing (Fig. 7), radial accessory cell (rac) generally present, origin radial veins variable, with vestige of 3A present; hindwing (Fig. 7) with secondary accessory cell; antennal apiculus not so long; Australia, Neotropics and Europe	2
2 Forewing, origin of R3, R4 and R5 connate basad, with veins arising two-thirds forewing costal margin length; antennal apiculus reduced and foreleg epiphysis less than half tibial length; male saccus bifurcate, reduced in length; penis curved; Australia	Subtribe Synemioniidi
2' Forewing, origin of R3, R4, R5 variable; foreleg epiphysis one-half or greater than tibial length; antennal apiculus well developed but not elongate (Fig. 2); male saccus bifurcate, variable in length; penis generally coiled; Central and South America, Europe	Subtribe Castniidi

Appendix 3 – (adults)

Key to genera of Castniidi (after Miller, 1986)

1 Forewing radial vein branched	2
1' Forewing radial veins usually not branched	Other genus
2 R2 and R3 not connate* basad	3
2' R2 and R3 connate basad	Other genus
3 R3 and R4 connate basad	4
3' Radial veins not as above	Other genus
4 Forewing ground colour predominantly brown with few markings	5
4' Forewing ground colour variable with prominent markings	Other genus

5 Forewing with forked, darker brown markings; hindwing ground colour variable, with two to three extradiscal spotbands	<i>Synpalamides</i>
5' Forewing markings not as above	6
6 Forewing grey-brown, maculation variable with semi-hyaline reversed y-shaped marking across distal half of wing, with forks extending to costal margin; hindwing ground colour variable, with prominent extradiscal spotbands	<i>Escalantiana</i>
6' Forewing pattern not as above	7
7 Forewing ground colour grey-brown, with prominent white diagonal band, extending from apex to anal margin, anastomosed with white midcostal bar: hindwing pale orange, with wide postmedian band	<i>Ircila</i>
7' Wing pattern not as above	8
8 Forewing, ground colour grey-brown with two white transverse bars: one across and one at end discal cell, both extending to lateral margin; hindwing variable in ground colour (reddish-orange to white), with two to three broad extradiscal spotbands	<i>Castnia</i>
8' Forewing without markings as described above, forewing broad toward apex	9
9 R4 and R5 arise from distal points connate basad	10
9' R3, R4 and R5 arise basally at same point	Other genus
10 Ground colour of forewing grey-brown, with erect scales along cubital veins and subcostal reticulum absent in males; hindwing ground colour dull orange with prominent dark brown spotband surrounding pale yellow spots and outlined in black	<i>Paysandisia</i> (monotypic genus†)
10' Wing pattern not as above	Other genus

*Connate: pertaining to structures that are fused or immovably united (Gordh & Headrick, 2001).

†*Paysandisia archon* is the only species in this genus.

Appendix 4 – (mature larvae)

(after Stehr, 1987)

Antennae much shorter than width of head, and inserted between the stemmata and base of mandibles (Fig. 4B).

Primary setae present.

Spines present on the venter of at least 1 abdominal segment of 1–9 (Fig. 4A); mature larvae large (borers in stems of banana, palm trees and other plants; tropical and subtropical): part of Castniidae including *Paysandisia* genus.