

Bald cypress (Cupressaceae) as an Unusual Host for the Exotic *Clepsis coriacana* (Rebel, 1894) (Lepidoptera: Tortricidae)

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ABSTRACT

Clepsis coriacana (Rebel, 1894), an exotic species expanding in the Iberian Peninsula, is reported causing severe defoliation on ornamental trees of *Taxodium distichum* for three consecutive years, this being a new host for this moth.

Key words: *Taxodium distichum*, *Clepsis coriacana*, Tortricidae, exotic insect, Portugal.

INTRODUCTION

The bald cypress, *Taxodium distichum* (L.) Richard (Cupressaceae), native to North America, is one of the few deciduous conifers worldwide, and a versatile tree for timber production, ecological restoration of wetlands and ornamental use (Farjon, 2010). Clem (2015) reviewed 17 species of Lepidoptera, from nine families, associated with this conifer in the United States, with Heppner (2003) listing additional four species, including the pond apple leafroller moth, *Argyrotaenia amatana* (Dyar, 1901). The pond apple leafroller moth, and the bald cypress leafroller, *Archips goyerana* (Kruse, 2000) are the only Tortricidae species associated with *T. distichum* in its native range. *Archips goyerana* appears to be host-specific and the most damaging pest of bald cypress (Kruse, 2000).

Outside its native range, the bald cypress has been planted with commercial and ornamental purposes in many countries but reports of damages caused by insects appear to be very rare. Here, we report on an unusual severe defoliation observed on *T. distichum* young trees, outside its native range and caused by a Tortricid moth.

MATERIAL AND METHODS

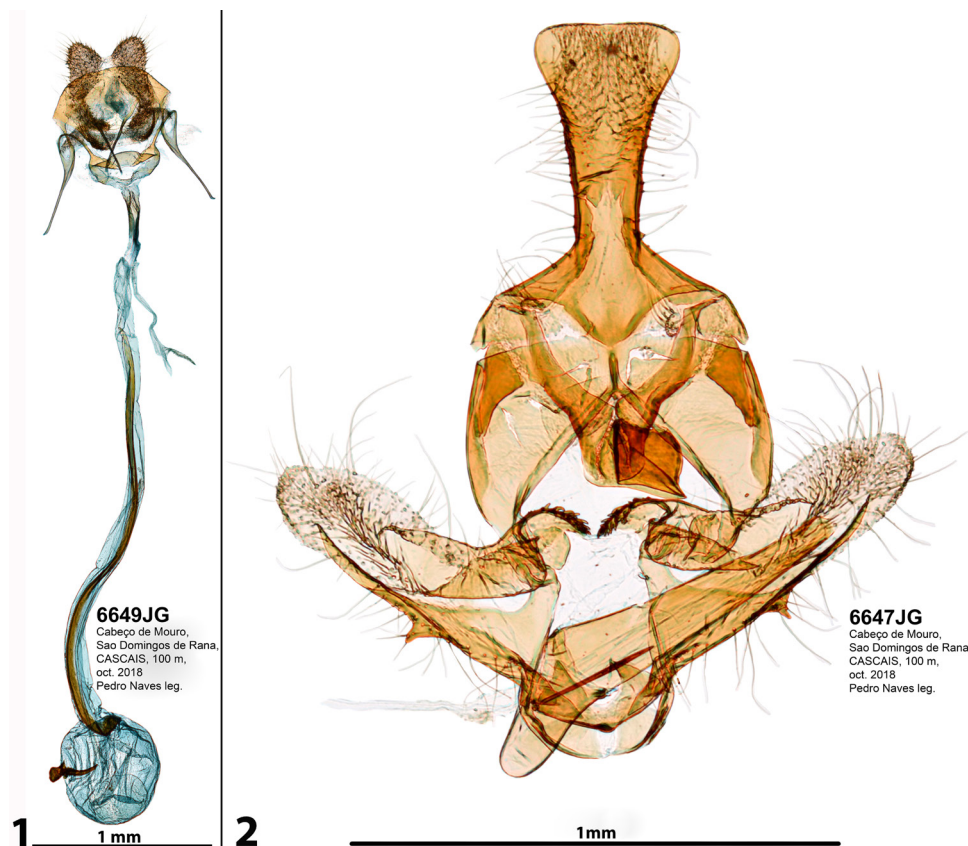
Larvae, pupae and adults of a Tortricid moth were collected from young (≈ 10 years old) bald cypress trees (which had been obtained from seeds) from a private garden in São Domingos de Rana, Cascais, Portugal (altitude 98 m, UTM 10x10 coordinate MC78). Eggs, larvae, pupae and moths were detected from May to early December, when leaves were present, with several consecutive generations throughout the year.

Immature insects were reared to adult under controlled conditions ($\approx 24^{\circ}\text{C}$), and five adult moths were prepared for genitalia observation, including three male (references 5783JG, 6647JG and 6648JG) and two female specimens (references 6649JG and 6650JG, in J. Gastón coll.). The preparations followed Robinson (1976) with minor adaptations. Observations were made using a NIKON Eclipse E400 microscope, and a NIKON D3100 and SONY $\alpha 100$ DSLR-A100K digital cameras, with AF 100 MACRO 1:2,8 (32) objective, and the photos enhanced with Adobe Photoshop \copyright software.

To support the morphological identification, adult moths were submitted to molecular analysis performed by sequencing the partial cytochrome c oxidase subunit I gene (COI), as described in detail in Catry et al, (2017).

RESULTS

Adults were identified, by examining the genitalia, as *Clepsis coriacana* (Rebel, 1894) (Tortricidae), which is also frequently (and erroneously) named *C. coriacanus*. *Clepsis coriacana* is morphologically close to *Clepsis neglectana* (Herrich-Schäffer, 1851), *Clepsis consimilana* (Hübner, 1817) and *Clepsis eatoniana* (Ragonot, 1881) [synonym *Clepsis razowskii* Gastón, Vives & Revilla, 2017 (Zlatkov & Huemer, 2019)], which are also found in the Iberian peninsula but can be distinguished by characters of the genitalia, with a more developed uncus of trapezoidal shape and a bigger length of the colliculum, and by a stronger sclerotization (Figs. 1-2).

Bald cypress (Cupressaceae) as an Unusual Host for the Exotic Clepsia coriacanaFigs. 1-2. Genitalia of *Clepsia coriacana*.

The morphological identification was fully supported by the molecular analysis; sequences were compared with the sequences registered in the public databases, and the 650 bp-long regions of the COI revealed 99.84 % similarity with one sequence of *C. coriacana* (registered as *Clepsia coriacanus* in BOLDSystems database) from the Canary Islands. Our sequences are now publicly available in GenBank database (NCBI) under accession number MK371069.

Extensive defoliation was observed on the young trees for three consecutive years (2017, 2018 and 2019), causing the wilting and dieback of small branches late in the season.

DISCUSSION AND CONCLUSIONS

Clepsia coriacana is native to the Canary Islands (Islands of Tenerife, Gran Canaria, La Gomera and La Palma) and Morocco (Klimesch, 1987), and was reported for the first time in continental Europe in 2006, in Gibraltar (Clifton, 2007). It was later found

in other locations in mainland Spain, namely in Catalunya in 2007 (Dantart & Jubany, 2010). It has also been located by one of the authors in Getxo and Berango (Vizcaya) during all the months of the year (Gastón, personal observation). In Portugal, this species is present at least since 2014 (Corley et al, 2018, reported as *C. coriacanus*), with no mention to its hosts. All records from Iberian Peninsula (Fig. 3) are in locations very close to the sea, suggesting *C. coriacana* prefers regions with mild oceanic climates, similarly to its native range in the Canary archipelago and Morocco.

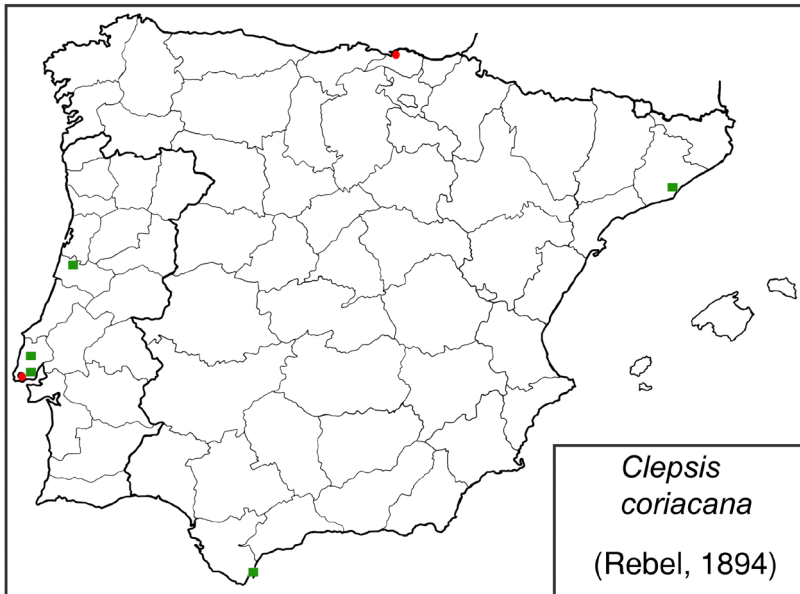


Fig. 3. Distribution of *Clepsia coriacana* in the Iberian Peninsula, including published references (Clifton, 2007; Dantart & Jubany, 2010; Corley et al, 2018 - green squares) and author's observations (red circles).

The genus *Clepsia* Guenée, 1845 comprises more than 100 species worldwide (Wang, Li, & Wang, 2003), including a few pests of cultivated plants. *Clepsia coriacana* is quite polyphagous, feeding on multiple hosts from various plant families (Razowski, 1979; Klimesch, 1987). However, this is apparently the first report of a *Clepsia* species feeding on a member of the Cupressaceae family (Brown, Robinson, & Powell, 2008). In its native range, *C. coriacana* is commonly known as “palomilla del peral” (pear orchard moth), being considered a minor pest of apple and pear orchards (Hernández, 2012), and locally listed as a harmful pest (Carrillo & Lana, 2002).

In addition to *T. distichum*, no other hosts were locally recorded for *C. coriacana* in São Domingos de Rana, but this moth appears to be a generalist herbivore with a capacity to feed on multiple hosts, including native and exotic plant species, and should therefore be monitored as one more alien species which may, eventually, affect host plants of ornamental and/or agricultural importance in the Iberian Peninsula.

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