

Additional information about the bionomics of *Pammene epanthista* (Lepidoptera: Tortricidae)

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Abstract. In July 2020 and 2021 larvae of *Pammene epanthista* (Meyrick, 1922) (Tortricidae) were found inside developing fruits and seeds of *Laserpitium gallicum* L. (Apiaceae) in southeastern France (Department of Hautes-Alpes). In this article, the genus *Laserpitium* is confirmed as host plant for this rare species. The observations made during the breeding and the searching for the specimens are described and illustrated.

Samenvatting. In juli 2020 en 2021 werden in Zuidoost-Frankrijk (Departement Hautes-Alpes) rupsen aangetroffen van *Pammene epanthista* (Meyrick, 1922) (Tortricidae) in de zich ontwikkelende vruchten en zaden van *Laserpitium gallicum* L. (Apiaceae). Dit artikel bevestigt het genus *Laserpitium* als voedselplant voor deze zeldzame bladrollersoort. De waarnemingen bij het uitkweken en zoeken van de exemplaren worden beschreven en geïllustreerd.

Résumé. En juillet 2020 et 2021, des chenilles de *Pammene epanthista* (Meyrick, 1922) (Tortricidae) ont été trouvées dans des fruits et des graines en développement de *Laserpitium gallicum* L. (Apiaceae) dans le sud-est de la France (Département des Hautes-Alpes). Dans cet article, le genre *Laserpitium* est confirmé comme plante hôte de cette espèce rare. Les observations faites lors de l'élevage et la recherche des spécimens sont décrites et illustrées.

Key words: *Pammene epanthista* — *Laserpitium gallicum* — Bionomics — France.

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Introduction

Pammene epanthista (Meyrick, 1922) (Tortricidae) was described in 1922 by Meyrick, based upon two French specimens found in the Département des Alpes-Maritimes; since then it has also been observed in the Département des Hautes-Alpes (Gibeaux 1985; Razowski 2003). In 2019 an adult moth was found in Fenestrelle, Italy, situated in the Cottic Alps near the French border by Huemer & Wieser (2020), who conclude that it is an endemic species in the southwest Alps. An observation of a specimen recorded at light on 18 June 2017 in Cajarc (Dép. Lot) was entered with pictures on Observation.org by Harm Alberts (Observation.org 2021). Although unconfirmed by examination of the genitalia, this actually seems to be an adult *P. epanthista*. In that case, the species occurs more westerly than previously assumed. Nevertheless, this tortricid moth is very rarely encountered (only 8 records are described in the literature) and little is known about its biology.

In July and August 1984 Christian Gibeaux captured four female specimens in Val-des-Prés (France), resting on the flowers of *Laserpitium montanum* Crantz (=syn. *Laserpitium siler* L.) (Apiaceae). The specimen observed by Huemer in Italy was sitting on the very same plant species, which made him think that *L. montanum* might be the host plant.

On 14 July 2020 the present author searched for larvae of Lepidoptera in the well-known 'Gorges de la Méouge' in Châteauneuf-de-Chabre (44°16'02.14"N 5°46'29.47"E, Département des Hautes-Alpes, France). A close inspection of the developing fruits of a *Laserpitium gallicum* L. plant revealed a few young unknown Tortricidae larvae that were collected to determine the species. Between 9 and 20 June 2021, three adults of *Pammene epanthista* emerged (Fig. 1). In 2021 more larvae of this species were found on *L. gallicum* in France.



Fig. 1. *Pammene epanthista* ♂, imago e.l. 09.vi.2021, bred from a larva on *Laserpitium gallicum*, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 1. *Pammene epanthista* ♂, imago e.l. 09.vi.2021, gekweekt uit een rups op *Laserpitium gallicum*, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2020. © Ruben Meert.

Observations

The infected *Laserpitium gallicum* plant in 2020 was situated on a rocky, xerothermic riverbank that might be temporarily flooded during high water levels (Fig. 2). Several inflorescences showed clusters of fruits that were spun together (Fig. 3) in a quite similar way as larvae of *Pammene aurana* (Fabricius, 1775) do with the fruits of *Heracleum sphondylium* L. (Apiaceae). Several larvae could be found inside the fruits (Fig. 4). Some infested inflorescences were picked and placed in a jar, partially filled with moist sand. At a later stage, frass could be observed between the spun fruits (Fig. 5). Feeding on the seeds, the larvae moved from one fruit to another, hollowing them out completely.



Fig. 2. *Laserpitium gallicum* with *Pammene epanthista* larva, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 2. *Laserpitium gallicum* met *Pammene epanthista* rups, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2020. © Ruben Meert.

An adult male *Pammene epanthista* emerged on 9 June (Fig. 1) and a female on 11 June 2021. That day, both moths were placed in a fine nylon mesh flight cage at 2:00 pm. At 6:00 pm the adults behaved quite restlessly in the cage. At 9:10 pm a copula was observed (Fig. 8), with the female's wings folded around the male. Mating ended at about 10:00 pm. Another male emerged on 23 June 2021.

A year later, a second search effort was made, this time in the region of Saint-Geniez (Dép. Alpes-de-Haute-Provence, France). On 4 July 2021 an adult male was observed feeding on one of the last flowering *Laserpitium gallicum* plants in that area (Fig. 9). Later that month, several larvae of *P. epanthista* were found inside spun fruits of the same plant species (Fig. 10) growing on a rocky roadside.

Only one of the larvae collected in July 2021 pupated during August and emerged in early September that year, after being kept in a Petri dish at room temperature (20–22°C), suggesting a very small second generation. The remaining specimens were placed outside to hibernate and brought back to room temperature by the end of March. They emerged by the end of April and the beginning of May 2022.

Presuming that the collected seeds of *Laserpitium gallicum* were all infested by *P. epanthista*, a description of a larva was made by studying a full-grown specimen in July 2022. However, in April 2022 five adults of *Epinotia thapsiana* also emerged and the described full-grown larva belonged to this species (conf. Jürg Schmid) (Fig. 12).



Fig. 3. Spun, developing fruits of *Laserpitium gallicum* with *Pammene epanthista* larva, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 3. Samengesponnen, zich ontwikkelende vruchtjes van *Laserpitium gallicum* met rups van *Pammene epanthista*, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2020. © Ruben Meert.



Fig. 4. *Pammene epanthista* larva in fruit of *Laserpitium gallicum*, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 4. Rups van *Pammene epanthista* in vruchtje van *Laserpitium gallicum* – Châteauneuf-de-Chabre, Frankrijk, 14.vii.2020. © Ruben Meert.

As apparently both species occur in abundance on the same spot in Saint-Geniez and show quite similar feeding signs, no description of a full-grown larva of *P. epanthista* can be provided so far.

The collected immature (probably half or nearly full-grown) larvae of *P. epanthista* had a brown head, darker towards the mouth parts (Fig. 4). The body was ivory coloured, sometimes with a greenish tinge. Pinacula and prothoracic plate concolorous. Prothoracic plate with some light brown spots posteriorly. Half-grown larvae of *E. thapsiana* look quite similar, but the prothoracic plate shows darker edges (Schmid 2019, pers. obs.) (Fig. 11). In the described breeding setups, pupation took place within a firm cocoon made of white silk amongst ground debris or in a piece of paper tissue. The pupa protruded from the cocoon before emerging in the early morning around 8:00 am (Fig. 6). The exuviae (Figs 6, 7) were about 7 mm long and pale brown.



Fig. 5. Feeding signs of *Pammene epanthista* larva on fruits of *Laserpitium gallicum*, Châteauneuf-de-Chabre, France, 09.vi.2021. © Ruben Meert.

Fig. 5. Vraatbeeld van rups van *P. epanthista* op vruchtjes van *Laserpitium gallicum*, Châteauneuf-de-Chabre, Frankrijk, 09.vi.2021. © Ruben Meert.

Fig. 6. *Pammene epanthista* ♀, exuvia e.l. 11.vi.2021, bred from a larva on *L. gallicum*, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 6. *P. epanthista* ♀, exuvia e.l. 11.vi.2021, gekweekt uit een rups op *L. gallicum*, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2021. © Ruben Meert.

Fig. 7. *P. epanthista* ♀, exuvia detail e.l. 11.vi.2021, bred from a larva on *L. gallicum*, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 7. *P. epanthista* ♀, exuvia detail e.l. 11.vi.2021, gekweekt uit een rups op *L. gallicum*, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2021. © Ruben Meert.

Fig. 8. *P. epanthista*, copula (♂ on the left, ♀ on the right), 11.vi.2021, specimens bred from larvae found on *L. gallicum*, Châteauneuf-de-Chabre, France, 14.vii.2020. © Ruben Meert.

Fig. 8. *P. epanthista*, copula (♂ links, ♀ rechts), 11.vi.2021, exemplaren gekweekt uit rupsen op *L. gallicum*, Châteauneuf-de-Chabre, Frankrijk, 14.vii.2020. © Ruben Meert.

Fig. 9. *Pammene epanthista* ♂, feeding on flowers of *Laserpitium gallicum*, Saint-Geniez, France, 04.vii.2021. © Ruben Meert.

Fig. 9. *Pammene epanthista* ♂, feeding on flowers of *Laserpitium gallicum*, Saint-Geniez, Frankrijk, 04.vii.2021. © Ruben Meert.

Fig. 10. *Pammene epanthista*, larva in fruits of *Laserpitium gallicum*, Saint-Geniez, France, 08.vii.2021. © Ruben Meert.

Fig. 10. *Pammene epanthista*, larva in fruits of *Laserpitium gallicum*, Saint-Geniez, Frankrijk, 08.vii.2021. © Ruben Meert.



Fig. 11. *Epinotia thapsiana*, fruits of *L. montanum* spun together by larva, Saint-Geniez, France, 08.vii.2021. © Ruben Meert.

Fig. 11. *Epinotia thapsiana*, vruchten van *L. montanum* samengesponnen door rups, Saint-Geniez, Frankrijk, 08.vii.2021. © Ruben Meert.

Although quite common in the region around Saint-Geniez, *Laserpitium montanum* plants were often not in flower in 2021. Only one inflorescence could be checked on 8 July 2021 and, here too, similar feeding signs were found (Fig. 11), but it also turned out to be *Epinotia thapsiana*. So *L. montanum* being a host plant for *P. epanthista* cannot be confirmed yet. Regarding the observations of adults mentioned in the past and the confirmation of *Laserpitium gallicum* as a host plant, this seems very likely though.

Other species on *Laserpitium* spp.

Pammene laserpitiana Huemer & Erlebach, 1999 is a species closely related to *P. epanthista*. It was described from the Italian Alps and its larvae feed on the seeds of *L. montanum* (Huemer & Erlebach 1999).



Fig. 12. *Epinotia thapsiana*, full grown larva, Saint-Geniez, France, 11.vii.2021. © Ruben Meert.

Fig. 12. *Epinotia thapsiana*, volgroeide rups, Saint-Geniez, Frankrijk, 11.vii.2021. © Ruben Meert.



Fig. 13. *Depressaria depressana*, pupa in inflorescence of *Laserpitium gallicum*, Saint-Geniez, France, 08.vii.2021. © Ruben Meert.

Fig. 13. *Depressaria depressana*, pop in bloeischerm van *Laserpitium gallicum*, Saint-Geniez, Frankrijk, 08.vii.2021. © Ruben Meert.

The immature stages of *Depressaria depressana* (Fabricius, 1775) can also be found within the inflorescences of *Laserpitium gallicum* (pers. obs.). In case of doubt, these features make it possible to distinguish them from those of *P. epanthista*: the larvae are green or brown with distinct white spots, black head, and thoracal plate (Lepiforum 2022). They do not actually feed within the fruits but construct tube-like webs between them. Pupation sometimes occurs in the larval habitat, the pupa lacking the spines on the abdomen (Fig. 13).

Several other Microlepidoptera occur on *Laserpitium* spp., amongst them different species belonging to the genera *Agonopterix*, *Depressaria*, *Epermenia*, *Eupithecia*, and *Phaulernis* (Lepiforum 2022).

Conclusions

These observations prove that *P. epanthista* larvae live inside the fruits of *Laserpitium gallicum*. Gibeaux and Huemer's presumption that they also feed on *Laserpitium montanum* is most likely correct.

P. epanthista is partially bivoltine. Adults are on the wing from June (Huemer & Wieser 2020) until August (Gibeaux 1985) and even September (pers. obs.). They can be observed in the afternoon and at the end of the day resting and feeding on the inflorescences of the host plant

(Gibeaux 1985, pers. obs.). Larvae can be found on the host plant in July and August and probably in small numbers in autumn. To ensure successful breeding, in both experiments larvae and pupae were left in their habitat during winter, but as with other *Pammene* species (Huemer & Erlebach 1999), *P. epanthista* probably hibernates as a larva inside a white silken cocoon and pupates in spring.

Hopefully, this additional data about this rarely encountered Tortricidae species will encourage lepidopterists to look for it, as some details concerning its bionomics and distribution still need to be fine-tuned.

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