

Teleiopsis laetitia sp. n. and *Teleiopsis lindae* sp. n., two hitherto overlooked mountainous European species (Gelechiidae: Teleiodini)

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Abstract. *Teleiopsis laetitia* sp. n. is described based on nine males and two females collected in the Alps of Grisons, Switzerland. Wing pattern and genital characteristics are described and illustrated. Further specimens originating from Austria, Italy, Macedonia, Greece and Turkey were identified in museum collections. *Teleiopsis lindae* sp. n. is described and characterized based on specimens collected in Spain and Portugal. Differential diagnosis is provided for these and related species.

Zusammenfassung. *Teleiopsis laetitia* sp. n. wird basierend auf neun Männchen und zwei Weibchen beschrieben, welche in der Bündner Val Tujetsch, Schweiz, gesammelt wurden. Die Beschreibung umfasst Flügelzeichnung, Genitalstrukturen und Habitatansprüche. Weitere Exemplare aus Österreich, Italien, Mazedonien, Griechenland und der Türkei wurden in Museumssammlungen gefunden. *Teleiopsis lindae* sp. n. wird beschrieben und abgebildet basierend auf Tieren aus Portugal und Spanien. Differentialdiagnostische Merkmale dieser und verwandter Arten werden dargestellt.

Resumaziun. Ina nova specia da tschitta, *Teleiopsis laetitia* sp.n. vegn descretta ord la Val Tujetsch, Grischun, Svizra. Igl aspect exteriur, la fuorma dallas genitalias sco era il biotop vegnan caracterisai e cumparegliai. Sco exemplars en collecziuns da museums muossan, exista quella specia era ell’Austria, ell’Italia, en Macedonia, en Grecia ed ella Turkia. *Teleiopsis lindae* sp. n. vegn descretta sebasond sin animals dalla Spagna e da Portugal. Atgnadads da quellas specias e da specias semegliontas vegnan muossadas si e discutadas.

Introduction

Teleiopsis bagriotella (Duponchel, 1840) occurs in the mountain regions of Europe, from Portugal to Greece and in Turkey (Huemer & Karsholt, 1999). It was described from France as *Anacampsis bagriotella*. The detailed description mentions a greyish-reddish ground colour, tinted with brown and a white band at the periphery of the forewings. A rather schematic drawing accompanies the description (Godart & Duponchel, 1838, p. 608, fig. 312) (Fig. 1). Herrich-Schäffer describes *Gelechia elatella* (Herrich-Schäffer, 1853) (Fig. 2) and the very careful and detailed figure 499 reveals beyond doubt that „*elatella*“ is a synonym of *A. bagriotella* Duponchel, an opinion first expressed by Joannis in 1915 and consequently embraced by the modern literature (Karsholt & Razowski 1996; Huemer & Karsholt 1999). Pitkin (1988) designated a lectotype from Vaugirard (France).

In a modern revision of the Gelechiidae family (Huemer & Karsholt, 1999) as well as in a Guide to the Microlepidoptera of Europe (Parenti, 2000), specimens showing a much more uniform dark coloring without the typical white banding of the forewing are illustrated apart from the „typical“ *bagriotella* phenotype. Linda Pitkin (1988) in a meticulous revision of the Genus *Teleiopsis*, had already observed that such dark phenotypes exist which she grouped into two “forms”: “southeastern”, occurring from Austria to Turkey and “southwestern” from the Pyrenees, Spain and Portugal. She also observed particular features in the genital apparatus of these “forms”. This material was

however considered insufficient to justify the erection of new species. Huemer & Karsholt (1999) mention that „this variation found in *bagriotella* seems, at least to some degree, to be geographical, and it may also be correlated with the geology of its localities“.

Abbreviations

BNM	Bündner Naturmuseum, Chur, Switzerland
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
ZMUC	Zoologisk Museum, Natural History Museum of Denmark, Copenhagen

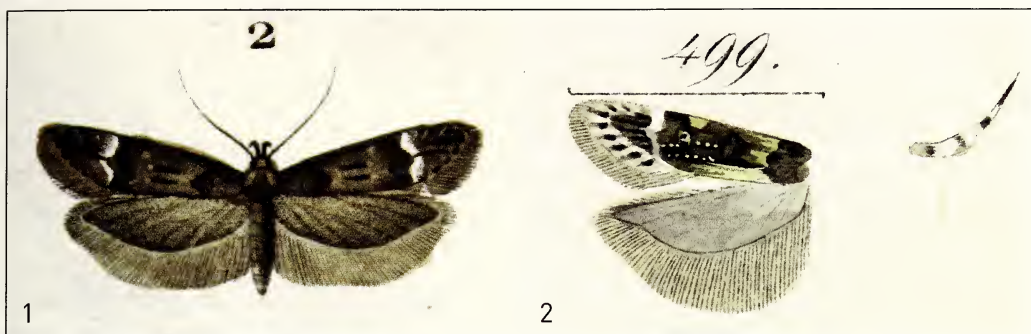
Material and Methods

In recent years, a total of 24 „*bagriotella*“ specimens have been collected at various localities in the Alps of Grisons, Switzerland. While the “typical” phenotype is widely distributed in this area, so far only the region of the Tujetsch valley situated in north-western Grisons harbours the “dark” phenotype in addition to the “typical” form. In total, eleven “dark” phenotypes from Tujetsch valley and 13 “typical” phenotypes from all over Grisons, six of which originated also from the Tujetsch valley, were available for study. From this material, five male and two female genital preparations of “dark phenotype” specimens were made according to standard procedures. They were embedded in water-soluble medium (Disney & Henshaw, 1988) between two transparent acetate foils and attached to the pin of the respective specimen. As controls five male and two female specimens of the “typical” phenotype, some originating from the same valley were examined.

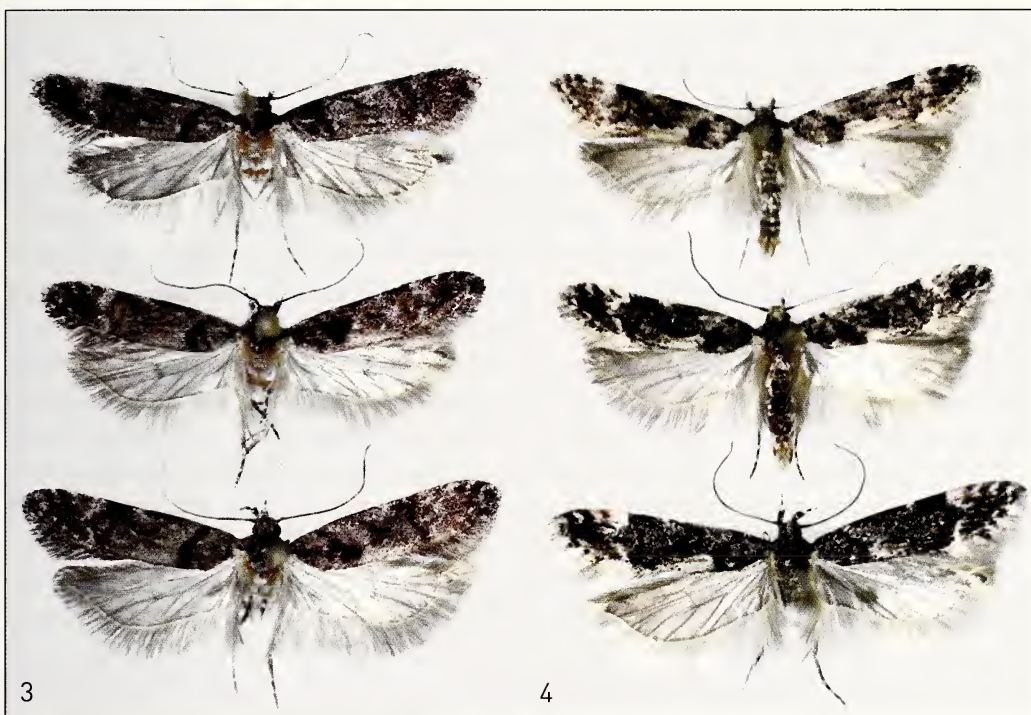
Two additional “dark” phenotypes from Austria and Italy were identified by external appearance in the TLMF (courtesy Dr. P. Huemer). Genital slides, male and female, were prepared and compared to “typical” specimens. From ZMUC (courtesy O. Karsholt), a total of 14 specimens from Italy, Greece and Turkey including some of the specimens determined by Pitkin as “southeastern form” of *T. bagriotella* were examined, partly dissected and analyzed.

Results

Analyzing field data and sampled specimens, the following observations were made: In the Tujetsch valley, the two phenotypes occur sympatrically but not strictly syntopically. They seem to occupy different microhabitats, which in some instances were situated close to each other at a distance less than 1 km (Fig. 5). No phenotypically intermediate specimens were observed. Careful examination of male and female genitalia revealed several constant major differences in both sexes between the two phenotypes. These characteristics were also present with remarkably little variation in the “dark” phenotype specimens from Italy to Turkey. These various findings, taken together, support the concept of two distinct species being involved. The “dark” phenotype of *T. bagriotella* is hereby described as new species.



Figs 1–2. Figures of original descriptions. 1. *Anacampsis bagriotella* (Duponchel). 2. *Gelechia elatella* (Herrich-Schäffer).



Figs 3–4. Habitus of phenotypes of *Teleiopsis* spp. All specimens collected in Grisons, Switzerland. 3. *T. laetitiae*, “dark” phenotype. 4. *T. bagriotella*, “typical” phenotype.

Teleiopsis laetitiae sp. n.

Material. Switzerland: Holotype: ♂, “CH [Switzerland]-Sedrun GR[Grisons] | Spinatscha, 1450 m | 26.vii.[20]05 LF | leg. Jürg Schmid“, gen. prep. Schmid, BNM Chur. – Paratypes: 1♂, 2♀ same data as holotype, gen. prep. Schmid; 4♂ Tujetsch Grisons, Surrein, Sum, LF, 1440 m, 17.vii.2006, leg. Schmid, (2♂ gen. prep. Schmid); 2♂ Tujetsch, Grisons, Val Nalps, Sax, Laserp. halleri Biot., 1480 m, 15.viii.2006, leg. Schmid, 1♂ gen. prep. Schmid; 1♂ Tujetsch, Grisons, Selva, 1600 m, 28.vii.2005, leg. Schmid, gen. prep. Schmid; coll. BNM, TLMF, ZMUC, coll. Schmid. **Austria:** ♂ Tirol, Nauders, 1400 m, 21.vii.1955, gen. prep. Schmid, TLMF. **Italy:** 1♀ Südtirol, Schnalstal, E.viii.1967, 800 m, leg. Zürnbauer, gen. prep. Schmid, TLMF; 1♂ Abruzzo, M. la Rocca, 1600–1950 m, 6 km SW. Pescasseroli, 13.–14.8.1972, leg.

R. Johansson, ZMUC, gen. prep. LMP no.111, *Teleiopsis bagriotella* (Duponchel) det. L. M. Pitkin, 1985 (southeastern form). 1♂ **Macedonia**, 20.vii.1982, Mavrovo, 1500 m, F. Schepler, gen. prep. Schmid, ZMUC. **Greece**: 2♂ **Greece**, Epiros, Katara Pass, 1200 m, Metsovo, 25.vii.1985, M. u. E. Arenberger, ZMUC; 2♂ Florina, 1 km NW Pisoderi, 14.vii.1998, 1600 m, B. Skule & D. Nilsson, ZMUC; 2♂ Hellas, Ioannina, Katara Pass, 1600 m, 11.viii.1985, M. Fibiger, ZMUC, gen. prep. Hendriksen 2143; 1♂ Hellas, Lakonia, Parnon Oros, 1700 m, 29.vi.1983, leg. B. Skule ZMUC, LMP genitalia slide 93, *Teleiopsis bagriotella* (Duponchel) det. L.M. Pitkin, 1985 (southeastern form). 3♂ **Turkey**, Prov. Kayseri, 5 km NW Eracios Dag, 2000 m, 22.vii.1986, leg. Fibiger, 1♂ gen. prep. Schmid, ZMUC; 1♂ Turkey, 15 km S, Erzurum, 3000 m, 20.vii.1989, leg. Fibiger & Esser, ZMUC; 1♂ Prov. Ankara, 20 km nw. Kizilcahamam, 1200 m, 24.vii.1986, leg. Fibiger, ZMUC.

Description. Wingspan, ♂: 18.6–22 mm (N=19), mean: 20.1 mm. ♀: 19.2–20.3 mm (N=3) mean: 19.7 mm. Some of the above mentioned specimens were not suitable for wingspan measurements as the wings were not suitably positioned.

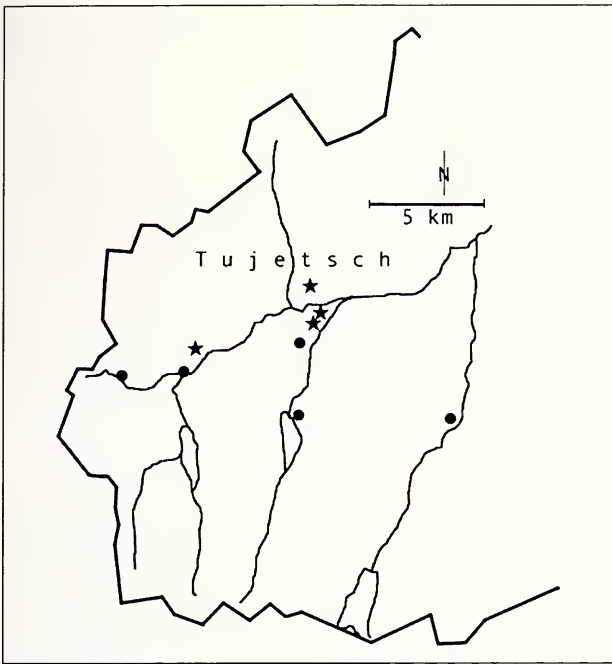
Male, female (Fig. 6): Head greyish brown, mottled, frons lighter. Third segment of labial palpi with two dark brown or black bands, tip grey. Thorax and tegulae greyish mottled. At posterior half of thorax a brown transverse band of raised scales. Ground colour of forewing greyish brown predominantly composed of light brown serrate scales with white tips. A pronounced black or dark brown band of raised scales at basal third extending obliquely from costa to dorsum. Band lined medially and distally by ferruginous raised scales. At mid forewing one or two irregular longitudinal patches of black raised scales, heavily lined ferruginous. Distal third of forewing beginning with a narrow dark transverse patch or band of raised scales, lined heavily ferruginous. Towards apex transverse zone of lighter scales. At costa, rarely a trace of pinkish scales. Near apex at mid wing, two thin longitudinal streaks of black scales, sometimes barely visible. Apical fringes mottled by white-tipped scales. Hindwings light grey.

Male genitalia (Fig. 7): Uncus narrow, tapered, pointed, always clearly extending beyond gnathos. Base of valva flush with or slightly posterior of sclerotized area of tegumen. Sacculus only slightly longer than apex of costa. Phallus slender, curved. Lamina of ductus ejaculatorius very long, longer than length of phallus. Posterior lobe of eighth tergite not reaching tip of choremata. Chorematial spine with a pointed, barbed hook end (Figs 26, 29).

Female genitalia (Figs 8–9): Similar to *T. bagriotella* and *T. diffinis*. Postero-dorsal emargination of antrum broader than in *bagriotella*. Subposterior pouch more anterior. Sclerotized longitudinal fold not reaching subposterior pouch and distinctly less developed than in *bagriotella*. Signum serrate, lobes tapered, one almost pointed, longer than width of base.

Derivatio nominis. The species is named in memory of Laetitia Schmid-Capeder.

Differential diagnosis (Figs 10–11). *T. laetitia* may easily be separated from *T. bagriotella* by the wing pattern and coloration. The white band at the distal part of forewing and a white patch at dorsum are always noticeable in *bagriotella*, in fresh as well as in worn specimens. *T. laetitia* has a strongly marked blackish oblique band at the proximal half of forewing. In the male genitalia, sacculus is only slightly longer than costa in *laetitia*, whereas in *bagriotella* it reaches considerably beyond costa. This feature is very constant. Lamina of ductus ejaculatorius is longer than the length of



● = *T. bagriotella*
 ★ = *T. laetitiae* sp. n.

Fig. 5. Tujetsch valley, the westernmost part of Grisons, Switzerland. Distribution of *T. bagriotella* and *T. laetitiae* sp. n.

phallus in *laetitiae* but much shorter in *bagriotella*. Choremata reach beyond posterior lobe of eighth tergite in *laetitiae*, while in *bagriotella*, they are shorter than or as long as posterior lobe. Chorematal spine is of complex shape and often in duplicate in *bagriotella*. In *laetitiae* the single spine has the form of a barbed hook (Figs 27, 29). In the female, the modest sclerotized fold and the smaller emargination of antrum in *T. laetitiae* distinguishes this species from *T. bagriotella*.

Biology. In Switzerland, both sexes of *T. laetitiae* were attracted to light at four different sites between 17.vii and 15.viii. These biotopes are south exposed, siliceous rocky slopes extending from 1440 m to 1600 m and characterized by xeromontane vegetation of which *Laserpitium halleri* (Apiaceae) was a regular element (although it is probably not the host-plant). *T. laetitiae* is certainly a rather local species and more restricted in distribution than *T. bagriotella*, which seems to prefer more mesophilic rocky habitats.

Distribution. The description of *T. laetitiae* was originally based on material collected in a small area in the Central Alps of Switzerland. In the course of this study, further specimens were detected in museum collections originating from Austria, Italy, Macedonia, Greece and Turkey. The “dark *bagriotella*” specimen from Greece illustrated in Huemer & Karsholt, (1999, fig. 49 a) is now part of the paratype series of *T. laetitiae*. A specimen from Valle d’Aosta, Italy, illustrated by Parenti (2000) certainly also represents *T. laetitiae*.

In the course of this study, alleged *bagriotella*-material from Spain and Portugal was also examined. Some of these specimens have been included in the *Teleiopsis*-revision by Pitkin (1988) and were then determined as “*T. bagriotella*, southwestern form”.

Examination of the genital structures confirmed the differences already observed by Pitkin and since these were found also in additional material and proved to be very constant, it was concluded that the Iberian “*bagriotella*” constitute a species of its own.

Teleiopsis lindae sp. n.

Material. **Portugal:** Holotype: ♂ “Portugal, BB | Serra de Estréla | Torre, 1950 m | 10.–11.vii.1986 | O. Karsholt”, “*Teleiopsis bagriotella* (Duponchel) det. L.M. Pitkin, 1985”; gen. prep. Schmid, ZMUC. – Paratypes: 2♂, 1♀ same data as holotype, *Teleiopsis bagriotella* (Duponchel) det. L.M. Pitkin, 1985, 1♂ gen. prep. Schmid, 1♀ L.M.P. Genitalia slide no. 126, ZMUC. **Spain:** 1♂ Hispania, 11.–22.1980, Sierra de Gredos, 1800 m, Garganta de las Pozas, M. u. E. Arenberger, ZMUC, illustrated in Huemer & Karsholt, 1999, fig. 49b. 1♂ – Leon, Llenaves de la Reina, 12.–26.viii.1997, Wolschrijn, gen. prep. Schmid, ZMUC; 1♀ Avila, Sierra de Gredos, 15 km S–SW Hoyos del Espinos, 1720 m, 27.–28.vii.1988, leg. M. Fibiger, gen. prep. Schmid, ZMUC.

Description. Wingspan, ♂: 18–21 mm (N=6), mean: 19 mm. ♀: 19 mm (N=1). Male (Fig. 14), female: Head dark brown to greyish brown, mottled, frons lighter. Third segment of labial palpi with two dark brown or black bands, tip pale. Thorax and tegulae brown to greyish mottled. At posterior end of thorax two conspicuous bunches of white scales. Ground colour of forewing dark brown with black elements: A black or dark brown band of partly raised scales at basal third extending obliquely from costa to dorsum. At mid forewing two irregular longitudinal patches of black raised scales, sometimes lined by brown scales. Distally a thin broken longitudinal line of white scales. Distal third of forewing beginning with two un conspicuous black patches. Apically thereof, a transverse band of pale or light brown scales, being broadest at costa, where pink scales predominate and gradually thinning towards dorsum. Near apex at mid wing, two thin longitudinal streaks of black scales. Termen of apex consisting of alternate black and white markings. Apical fringes fuscous and mottled by white-tipped scales. Hindwings light grey.

Male genitalia (Fig. 15). Uncus narrow, tapered, pointed, extending beyond gnathos. Base of valva flush with or slightly posterior of sclerotized area of tegumen. Sacculus longer than apex of costa. Phallus slender, almost straight. Lamina ductus ejaculatorii long, longer than length of phallus. Posterior lobe of eighth tergite extending beyond choremata. Chorematial spine ending in a hook (Fig. 28).

Female genitalia (Figs 16–17). Similar to *laetitia*. Posterodorsal emargination of antrum broad. Sclerotized longitudinal fold reaching subposterior pouch and distinctly more developed than in *laetitia*. Signum small, lobes serrate, longer than width of base and conspicuously slender.

Derivatio nominis: In honor of Linda M. Pitkin who first discovered morphological differences in *bagriotella*-subpopulations.

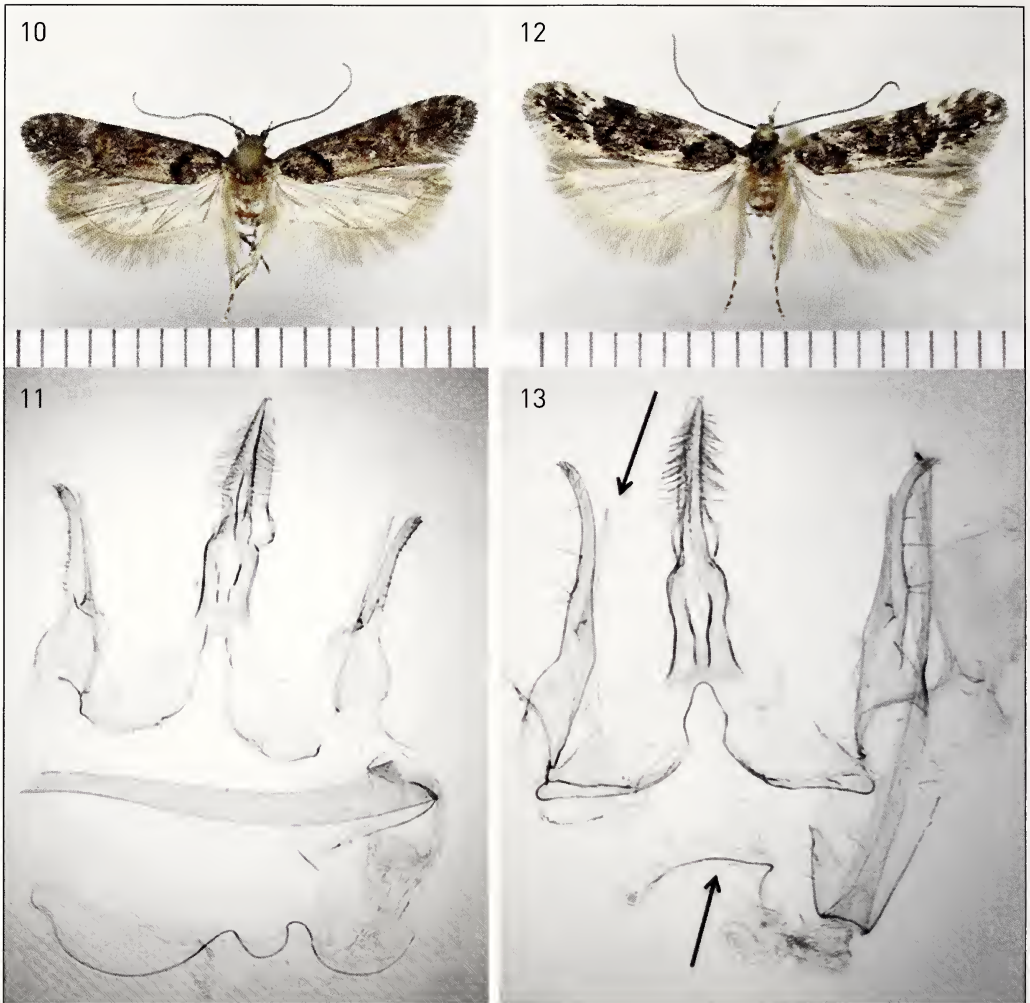
Biology. In Portugal, *T. lindae* was captured just after dusk in an open area with scattered grassland, some herbs and small bushes and with patches of snow still in early July (O. Karsholt, pers. comm.)

Distribution. *T. lindae* was found in mountainous areas in Spain and Portugal at altitudes from 1720 to 1950 m. Pitkin (1988) mentions material from the French Pyrenees, which she attributed to the “southwestern form” of *bagriotella* i.e. *T. lindae*.



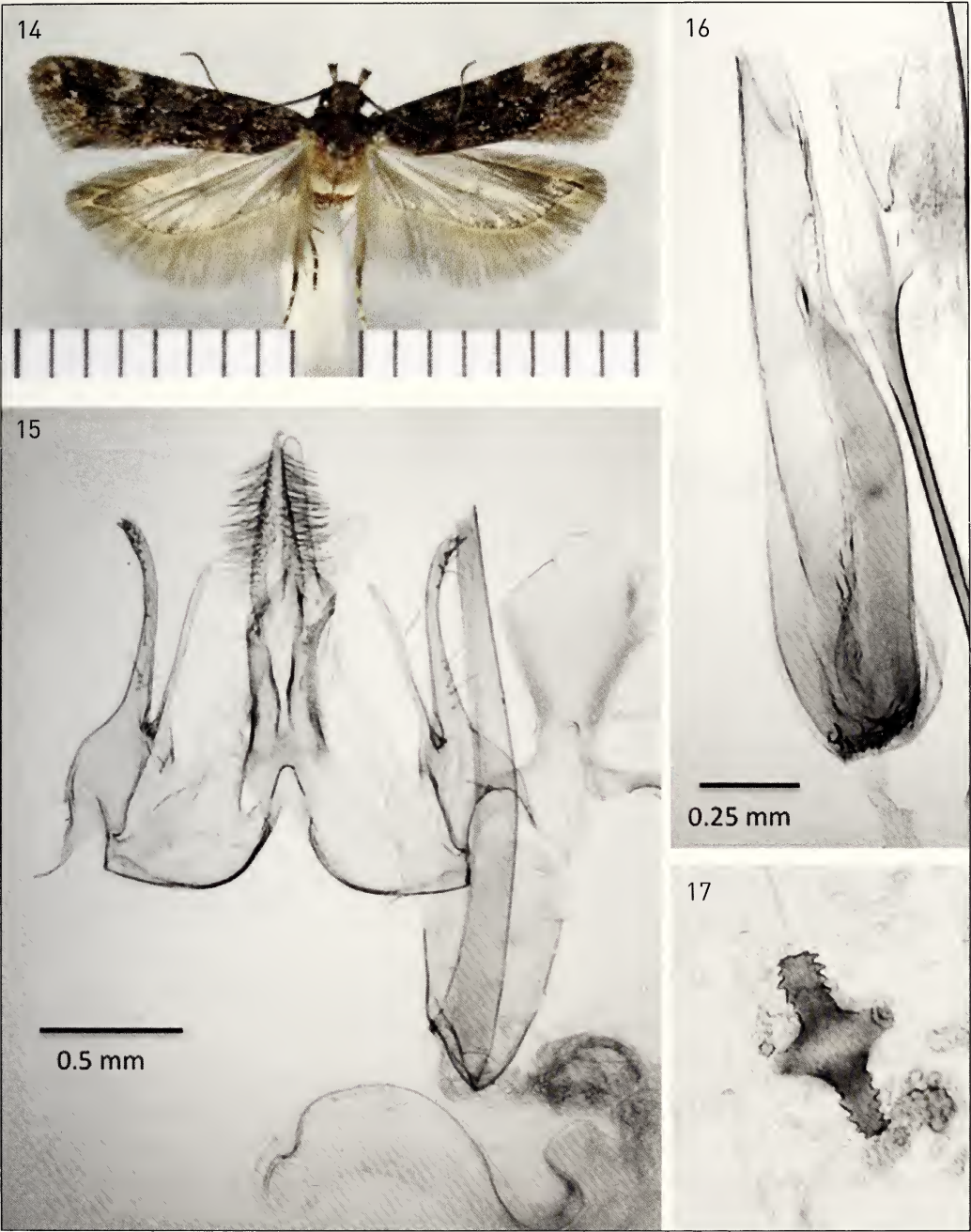
Figs 6–9. *T. laetitiae* sp. n. 6. Holotype. 7. Male genitalia. 8. Antrum. 9. Signum.

Differential diagnosis. While *T. bagriotella* and *T. laetitiae* are easily separated by external characters and male and female genitalia, *T. lindae* lies somewhat in between (Figs 18–20). The following criteria may be applied to unambiguously separate the three species:



Figs 10–13. Comparison of habitus and genital structures of *T. laetitiae* (10–11) and *T. bagriotella* (12–13). Note the considerably longer sacculus in *bagriotella* and the shorter lamina ductus ejaculatorii (arrows).

- Valva: sacculus much longer than costa in *bagriotella*, clearly longer in *lindae* and barely longer in *laetitiae* (Figs 21–23).
- Lamina ductus ejaculatorii: short in *bagriotella*, long in *lindae* and *laetitiae* (Figs 11, 13, 15).
- Coremata: slightly shorter or as long as lobe of tergite in *bagriotella*, shorter in *lindae* and longer to much longer in *laetitiae* (Figs 24–26).
- Coremata spine: complex hook in *bagriotella*, rounded hook in *lindae* and acute barbed hook in *laetitiae* (Figs 27–29).
- Antrum with small emargination in *bagriotella*, wide in *lindae* and *laetitiae*. Sub-posterior pouch near posterior margin in *bagriotella*, more anterior in *lindae* and *laetitiae*. Sclerotized fold well developed and reaching subposterior pouch

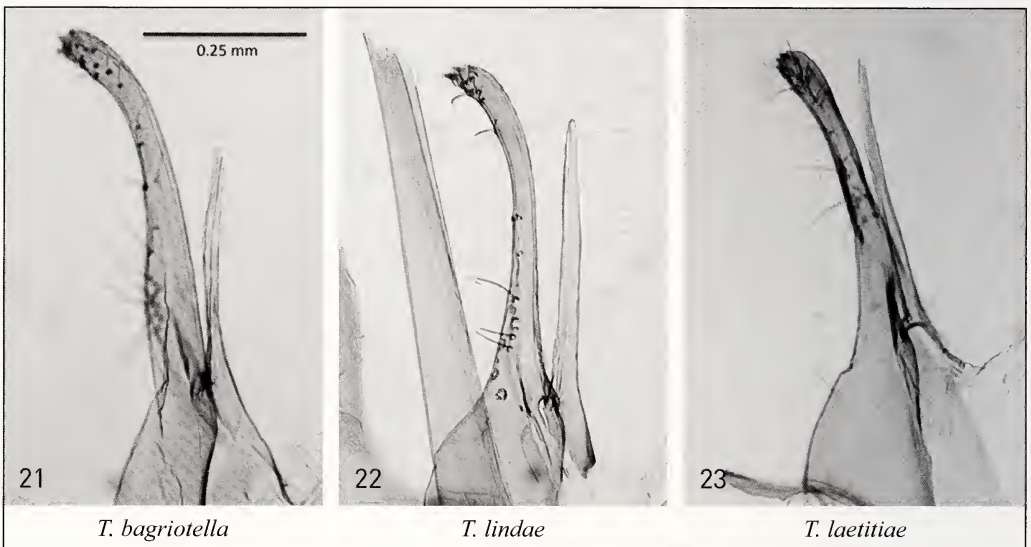


Figs 14–17. *Teleiopsis lindae* sp. n. **14.** Holotype. **15.** Male genitalia. **16.** Antrum. **17.** Signum.

in *bagriotella*. In *lindae*, this fold is also well developed and reaches pouch also, but since pouch is more anterior, fold is shorter. In *laetitiae*, fold is modest and does not reach pouch (Figs 30–32).



Figs 18–20. Adults of *Teleiopsis* spp. 18. *T. bagriotella*. 19. *T. lindae*. 20. *T. laetitiae*.



Figs 21–23. Valvae of *Teleiopsis* spp. 21. *T. bagriotella*. 22. *T. lindae*. 23. *T. laetitiae*.

- Signum square in *bagriotella*, with more tapering arms in *laetitiae* and with long and slender arms in *lindae* (Figs 34–36).

T. laetitiae and *T. lindae* are externally very similar to *Teleiodes diffinis* (Haworth, 1828). Although the latter is generally easily separated from *T. laetitiae* and *T. lindae* by its considerably smaller wingspan (*T. diffinis*: 13–18 mm, *laetitiae*: 19–22 mm, *lindae*: 18–21 mm), single specimens of *T. diffinis* may exceptionally reach almost the size of *T. laetitiae*. In these cases, identification may only be achieved by genital dissection. In the male, the rounded tip of uncus separates *T. diffinis* from *T. lindae* and *T. laetitiae*; in sacculus, there is a conspicuous bulgy dilatation in *diffinis* (Fig. 39). In the female, the antrum presents distally with a circular, lid-like structure below the distal emargination (Fig. 33).



Figs 24–26. Eight tergite with coremata. 24. *T. bagriotella*. 25. *T. lindae*. 26. *T. laetitia*.



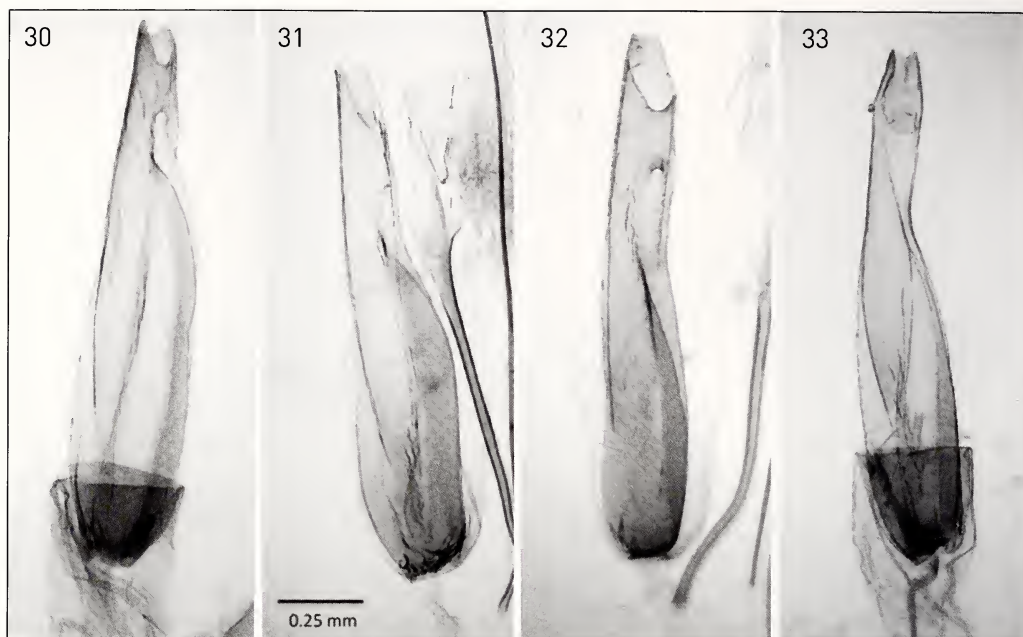
Figs 27–29. Coremata spine. 27. *T. bagriotella*. 28. *T. lindae*. 29. *T. laetitia*.

Another species superficially very similar to *T. laetitia* is *Teleiopsis latisacculus* Pitkin, 1988, recorded from Macedonia, Turkey and Egypt. Apart from its smaller wingspan, it may also be identified by genital dissection (see Huemer & Karsholt, 1999).

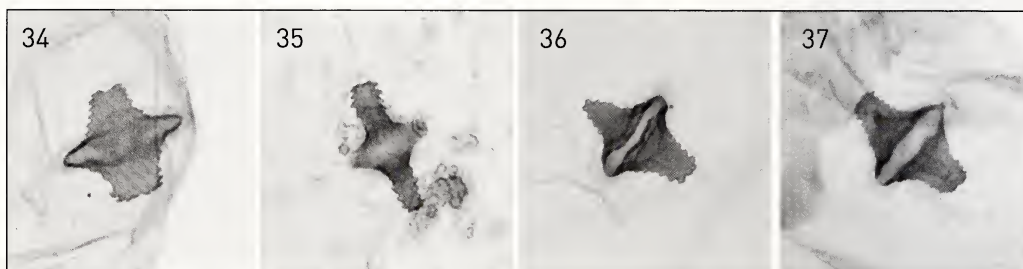
Discussion

The fact that the sympatrically occurring *T. bagriotella* and *T. laetitia* differ not only in external appearance but also show constant differences in their genital structures of both sexes justifies their taxonomic rank as separate species. The occurrence of *T. bagriotella* has been verified in light of these findings anew and thus ascertained as occurring in the French Alps (e.g.: Col de la Boira, Col du Galibier, Col de la Lombarde, Col d'Izoard, Col des Seigneurs [all in TLMF]), in Italy (e.g. Sella-Gruppe, Schnalstal [in TLMF]), in Switzerland (e.g. Graubünden [coll. Schmid and TLMF]), in Austria (e.g. Salzburg, Venedigergruppe, Tirol [in TLMF]), in Montenegro (Durmitor [in TLMF]) and in Macedonia [in TLMF]. Thus in many parts of Europe both species may occur in sympatry.

The case of *T. lindae* is not so straightforward: this taxon occurs in a region where both *T. bagriotella* and *T. laetitia* are absent. By external appearance and some



Figs 30–33. Antra of *Teleiopsis* spp. 30. *T. bagriotella*. 31. *T. lindae*. 32. *T. laetitia*. 33. *T. diffinis*.



Figs 34–37. Signa of *Teleiopsis* spp. 34. *T. bagriotella*. 35. *T. lindae*. 36. *T. laetitia*. 37. *T. diffinis*.

genital characters, this species resembles *laetitia* rather than *bagriotella*. Hence, the possibility that *T. lindae* is a western subspecies of *laetitia* cannot entirely be discarded. However, the genital differences in both sexes as already observed by Pitkin (1988) were confirmed and validated by additional material in this study. It seems reasonable therefore to consider *T. lindae* a distinct species. It remains to be seen whether or not molecular data will confirm this interpretation in the future.

Acknowledgements

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Fig. 38. *T. diffinis* (top) and *T. laetitiae* (below). **Fig. 39.** Uncus, gnathos and sacculus of *T. diffinis* (right).

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