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Agonopterix guanchella Buchner, sp. n., a new species of Depressariidae from Canary Islands (Spain) (Lepidoptera: Depressariidae)

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Abstract

Agonopterix guanchella Buchner, sp. n. is described. It has been collected from three different places, all in Gran Canaria, Canary Islands, Spain. The adult and genitalia of both sexes of the new species and some similar species are illustrated. Hostplant is unknown so far, and a species closely related to it could not be detected.
KEY WORDS: Lepidoptera, Depressariidae, *Agonopterix*, new species, DNA Barcoding, Canary Islands, Spain.

Agonopterix guanchella **Buchner, sp. n., una nueva especie de Depressariidae de las Islas Canarias (Spain) (Lepidoptera: Depressariidae)**

Resumen

Se describe *Agonopterix guanchella* Buchner, sp. n. Ha sido colectada de tres sitios diferentes, todos en Gran Canaria, Islas Canarias, España. Se ilustran el adulto y la genitalia de ambos sexos de la nueva especie y algunas especies similares. La planta nutricia es desconocida hasta el momento y no se pudo detectar una especie estrechamente relacionada con ella.
PALABRAS CLAVE: Lepidoptera, Depressariidae, *Agonopterix*, nueva especie, Código de barras ADN, Islas Canarias, España.

Introduction

In the collection of Jari Junnilainen a single male of an unnamed *Agonopterix* from Gran Canaria, Fataga, 10-XII-2014, was found in 2016. External appearance was reminiscent of some forms of *A. thapsiella* (Zeller, 1847) at a cursory glance, but presence of two white dots in forewing centre does not correspond with this species. Comparison of genitalia and barcodes showed that this specimen was not even closely related to any known species. As no females were available, description was postponed in the hope of finding females, otherwise it was scheduled to be described in the volume "Microlepidoptera of Europe: Depressariinae", which was in preparation, but far from being in a final stage at that time. In 2021, Per Falck asked for determination of several Depressariinae from Canary Islands (Spain), among them three specimens of this undescribed species, all females, opening the way for the description presented here. Several details remain unresolved. The hostplant is unknown, and it was not possible to find the closest relatives of this remarkably isolated species.

Methods

Morphological examination: genitalia preparations followed standard techniques (ROBINSON,

1976). Male preparations were stained with mercurochrome and females with chlorazol black, which brings a better result than using the same stain for both sexes.

Photographic documentation: photos of set specimens were taken with Canon EOS 5D Mark III, either with Canon lens EF 100 mm 2.8 L IS USM at 1:1, illuminated with two external flashes and using a third flash to set the background whiteness (specimens in total), or with Canon lens MP-E 65 at 2:1, using ring flash (specimen details). Genitalia photos were taken with microscope (Wild Heerbrugg) using a 10x objective and a 2.5x ocular. All photos were edited using the software Helicon Focus 4.80 and Adobe Photoshop 6.0.

Abbreviations

DEEUR	"Depressariinae of Europe", prefix for specimen-number of Depressariinae studied by P. Buchner. This unique number is pinned to all those specimens for certain identification.
MNCN	Research Collection of Antonio Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain.
NMBE	Naturhistorisches Museum, Bern, Switzerland.
RCAM	Research Collection of Anton Mayr, Feldkirch, Austria.
RCCM	Research Collection of Carlo Morandini, Udine, Italy.
RCJJ	Research Collection of Jari Junnilainen, Vantaa, Finland.
RCKN	Research Collection of Kari and Tomi Nupponen, Espoo, Finland.
RCMC	Research Collection of Martin Corley, Oxfordshire, England.
RCPF	Research Collection of Per Falck, Nexø, Denmark.
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria.
ZSM	Zoologische Staatssammlung München, Germany.

Agonopterix guanchella Buchner, sp. n.

Holotype 1 ♀, Spain, Canary Islands, Gran Canaria, Barranco de Guayadeque, 800 m, 9-22-VI-2021, gen. prep. DEEUR 9262 P. Buchner, Per Falck leg., deposited in coll. Museo Nacional de Ciencias Naturales, Madrid, Spain (MNCN).

Paratypes (arranged according to collection date): Spain, Canary Islands, Gran Canaria, Fataga, 1 ♂, 10-XII-2014, gen. prep. DEEUR 4558 P. Buchner, DNA barcode id. TLMF Lep 19294, Jari Junnilainen leg., deposited in coll. MNCN. Canary Islands, Gran Canaria, Ayacata (DEEUR 9273) and Barranco de Guayadeque, 800 m (DEEUR 9274), 2 ♀♀, 9-22-VI-2021, Per Falck leg., will be deposited in coll. RCPF

Adult (figs 1-9): Wingspan 22.5-26 mm. Head: face with appressed creamy white scales, these gradually change to mid grey toward frons, vertex with erect, long and narrow scales, greyish with ochreous tinge, tips markedly paler. Labial palp segment 2 inner side pale buff with a few dark grey scales interspersed, outer side medium greyish mixed with pale scales, ventral side with long, protruding, predominantly greyish scales with paler tips; segment three with a mix of grey and pale scales at base, a distinct dark grey ring beyond middle followed by a short pale section, a few blackish scales at tip. Antenna dark grey fuscous. Thorax and tegulae predominantly medium grey with a few blackish scales interspersed, with posterior crest. Forewing elongate with subacute apex forming an angle of about 70º, dull grey, extensively speckled with scattered blackish scales, some more concentrated to form small dark patches mainly near dorsum and termen, basal field grey, not clearly paler than ground colour, outwardly demarcated by a dark grey to blackish basal fascia fading into ground colour; a blackish dot at extreme base of costa, several blackish spots on costa, strongest towards apex and a series of terminal dots; a pair of blackish oblique dots at 1/3 and an elongated plical mark, white dots in middle and at end of cell, both with an incomplete ring of blackish scales, a diffuse dark grey blotch between median white dot and costa, slightly closer to proximal than to

distal white dot; underside dark grey, only on costa and near termen predominantly pale buff; fringe grey. Hindwing light to medium grey, slightly darker towards apex, underside uniformly grey in dorsal 2/3, interspersed with darker scales in costal 1/3, costal and terminal area predominantly buff, fringe light grey with three lines, only the basal distinct. Fore- and midlegs predominantly dark brown (fig. 8), hindlegs pale buff with a few dark scales interspersed (fig. 9). Abdomen light grey-buff.

Male genitalia (fig. 15): Socii elliptic, 0.2 mm wide and 0.3 mm long, outer sides nearly parallel in standard setting, uncus distinct, triangular, transverse diameter ca. 0.15 mm at base, 0.07 mm long, slightly overtopped by socii, gnathos elliptic, medium-sized, 0.15 mm wide and 0.3 mm long, equalling socii. Transtilla narrow, not widened medially with a width of about 0.02 - 0.03 mm, transtilla lobes remarkably narrow, semi-elliptic, about 0.2 mm wide and 0.1 mm long, with a gap of less than 0.1 mm in between. Anellus medium-sized, length/width 0.25/0.25 mm, gap to transtilla 0.15 mm, caudal margin with V-shaped incision which is filled with a rather thick membrane, therefore the incision is rather indistinct, anellus lobes rather small, length/width about 0.15/0.05 mm, semi-elliptic. Valva of average *Agonopterix* shape, costal margin nearly straight, ventral margin in basal half nearly straight, only in area of origin of cuiller very slightly concave, distinctly convex only between 3/5 and 4/5, then running straight to subobtuse apex; median length about 1.4 mm, 0.4-0.5 mm broad in basal half. Cuiller stout, width about 0.05 mm, not or scarcely tapering, ending about 0.05 mm before costa, blunt, very slightly curved inward over its whole length. Aedeagus stout, 1.2 mm long, gently curved near middle by about 40º, diameter 0.15-0.17 mm in basal 2/3, then tapering to subacute tip, sclerotised basal parts with a total length of about 0.4 mm, free section in ventral view rectangular, 0.25 mm long and 0.15 mm wide, terminating nearly straight, cornuti very small, numerous, in two not clearly separated groups.

Female genitalia (figs 10-14): Papilla analis about 0.7 mm long, 0.3 mm broad in lateral view, posterior apophysis 0.8 mm, anterior apophysis 0.4 mm, sternite VIII at anterior margin with semi-elliptic expansion accommodating ostium, length 0.5 mm if expansion is included and 0.3 mm if it is not included, maximum width about 1.0 mm in standard preparation, ostium elliptic, 0.2 mm long and 0.12 mm wide with distinct triangular projections of ductus bursae; lateral margins of semi-elliptic expansion with a rim, which is very distinct as long as these parts remain uncompressed and intersegmental membrane which connects segment VII and VIII is present (fig. 12, the most distinct single feature in female genitalia), in standard slide it tends to become indistinct when flattened by the pressure of the cover glass (figs 10-11); ductus bursae starting without distinct structures apart from tiny dots with a width of about 0.15 mm, after about 0.5 mm additional fine irregular folds appear, which gradually get more distinct and ductus widens to 0.4 mm in its course, after about 3 mm meeting pyriform corpus bursae (1 mm wide and 1.5 mm long in the available specimen, but corpus bursae tends to expand when females mate); signum rather small with a width/length of about 0.3/0.1 mm, with only a few teeth in two transverse rows; origin of ductus spermathecae very close to ostium and ending with about 6 turns.

Differential diagnosis: Externally the combination of grey colour, presence of two white dots in forewing centre, subsquare forewings with termen nearly straight and rather large size is distinct and will be sufficient to recognize this species in most cases. Only some forms of *A. thapsiella* (Zeller, 1847) (fig. 19) or further species of *A. adspersella* group may be similar but lack the second (proximal) white dot in forewing. Species common in Canary Islands with two white dots developed are e. g. *A. conciliatella* (Rebel, 1892) (fig. 20) and *A. scopariella* (Heinemann, 1870), both very variable externally but with different wingshape, especially termen which is concave. Genitalia of both sexes are distinct and can clarify cases of doubt.

Male genitalia: Combination of details of socii (not overtopped by broad elliptic gnathos, clearly longer than wide, with outer sides nearly parallel in standard preparation), valva rather narrow with stout, blunt, very slightly bent inward cuiller, anellus lobes small and transtilla lobes clearly wider than long is not found in any other *Agonopterix* sp. At cursory glance, male genitalia of *A. ocellana*

(Fabricius, 1775) (with very different external appearance) may be similar, but with several different details, especially shape of socii.

Female genitalia: anterior margin of sternite VIII with semi-elliptic expansion with lateral rims accommodating ostium is an unique feature. Important to note, these rims tend to become less distinct, when intersegmental membrane is removed, and genitalia are flattened by embedding. But presence of proximal expansion of segment VIII and its outline should be sufficient to exclude further species. Central expansion at anterior margin of sternite VIII is generally an unusual feature in genus *Agonopterix*, e. g. it is found in *A. silerella* (Stainton, 1865), where it is smaller and semicircular (fig. 21), also in *A. subtakamukui* Lvovsky, 1998, with rims not at lateral edges but inside the expansion and ostium near distal edge of sternite VIII (fig. 22). *A. thapsiella* and further species of *A. adspersella* subgroup have very different outline of sternite VIII (fig. 23).

Genetic data: Specimen DEEUR 4558 has been sequenced, its sequence is accessible via the public dataset DS-DEEUR392 (http://www.boldsystems.org/index.php/Public_SearchTerms?query =DS-DEEUR392), together with sequences and further data of all specimens used for the NJ-tree (fig. 24).

Related species: A determination request, using all full length sequences in BOLD database, showed the North American *A. oregonensis* Clarke, 1941 (Apiaceae-feeder, subgroup unknown) as nearest neighbour with p-distance of 3.36%, *A. straminella* (Asteraceae-feeder, *A. pallorella*-subgroup) as second nearest neighbour with p-distance of 3.82%, followed by three Apiaceae-feeder, *A. babaella* Amsel, 1977 (3.89%, *alpigena*-subgroup), *A. agyrella* Rebel, 1917 (3.90%, *A. putridella*-subgroup) and *A. alstromeriana* (Clerck, 1759) (3.99%, *A. alstromeriana*-subgroup). A critical look at this result is necessary: this calculation is not as accurate as the result down to a hundredth of a percent suggests, because the algorithm in BOLD treats sequences with a gap in between as full length. If the differences in the part of the sequence which is lacking is greater than the average of the hypothetical full length difference, the calculation shows a smaller than the real p-distance. But the inaccuracy is at most a few tenths of a percent.

More important is the fact, the five closest species belong to five (sub)groups. Obviously, distances of 3-4 % are commonly found between quite unrelated species, and the conclusion which must be drawn is that these species are nothing but unrelated species which by coincidence are the closest in p-distance.

The result of the search for the closest related species of *A. guanchella* is that it is very isolated, no species close to it could be detected.

Distribution: So far known from Canary Islands, Gran Canaria.

Biology: Foodplant unknown. Moths have been collected in June and December which suggests that the species hibernates as imago and eggs are laid in winter or early spring.

Derivation of name: The species is named after the Guanches, the indigenous inhabitants of the Canary Islands.

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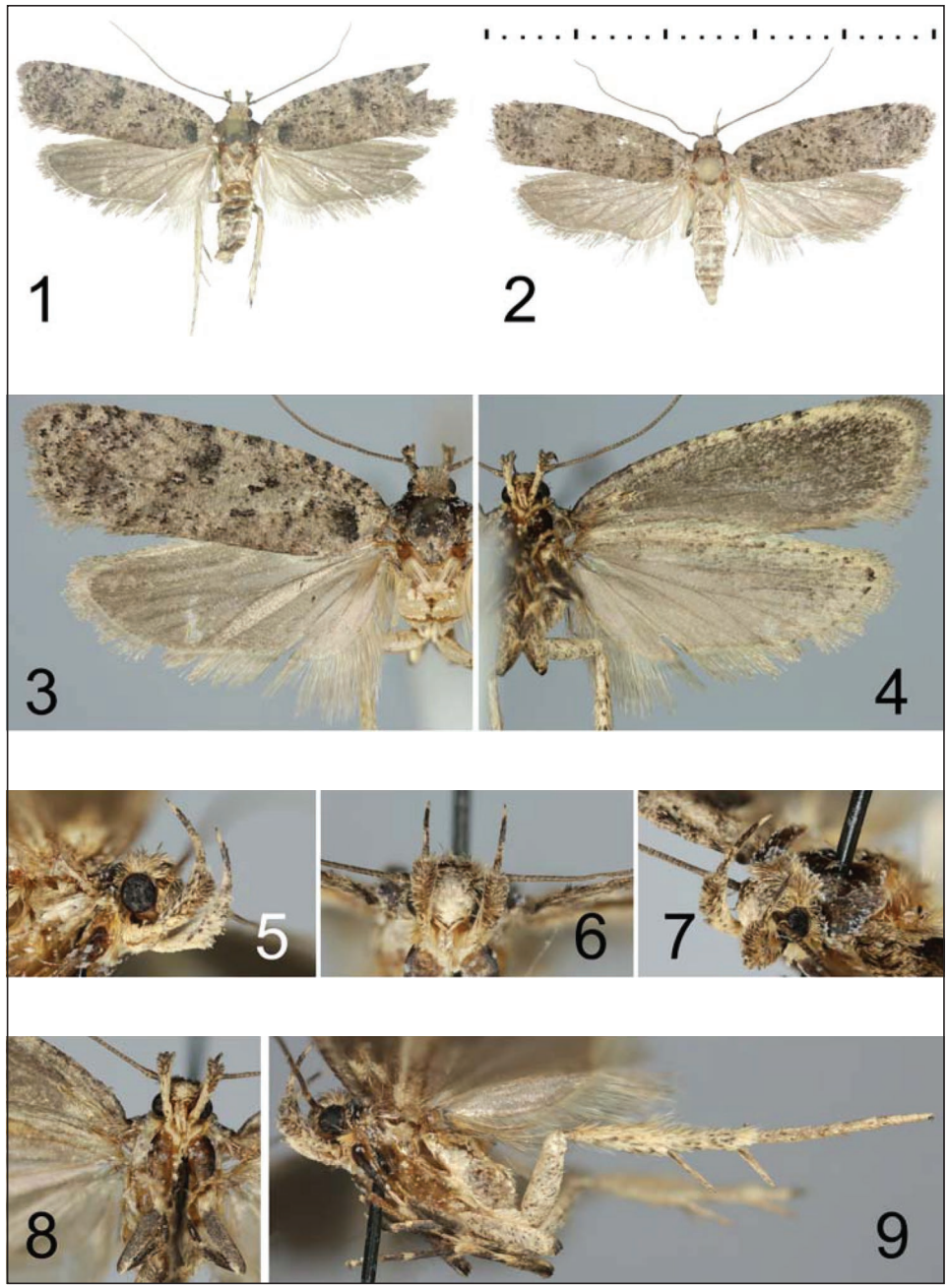
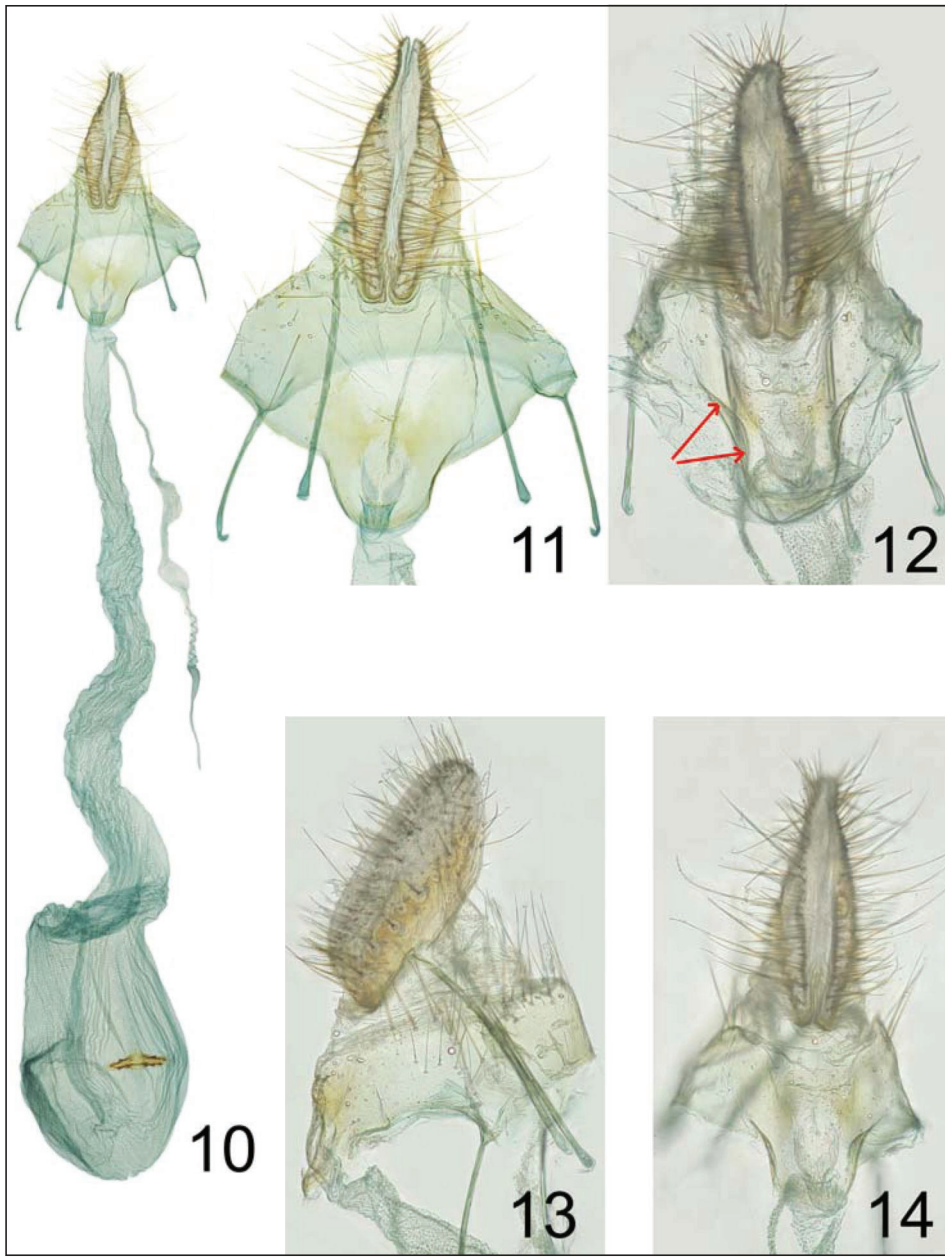
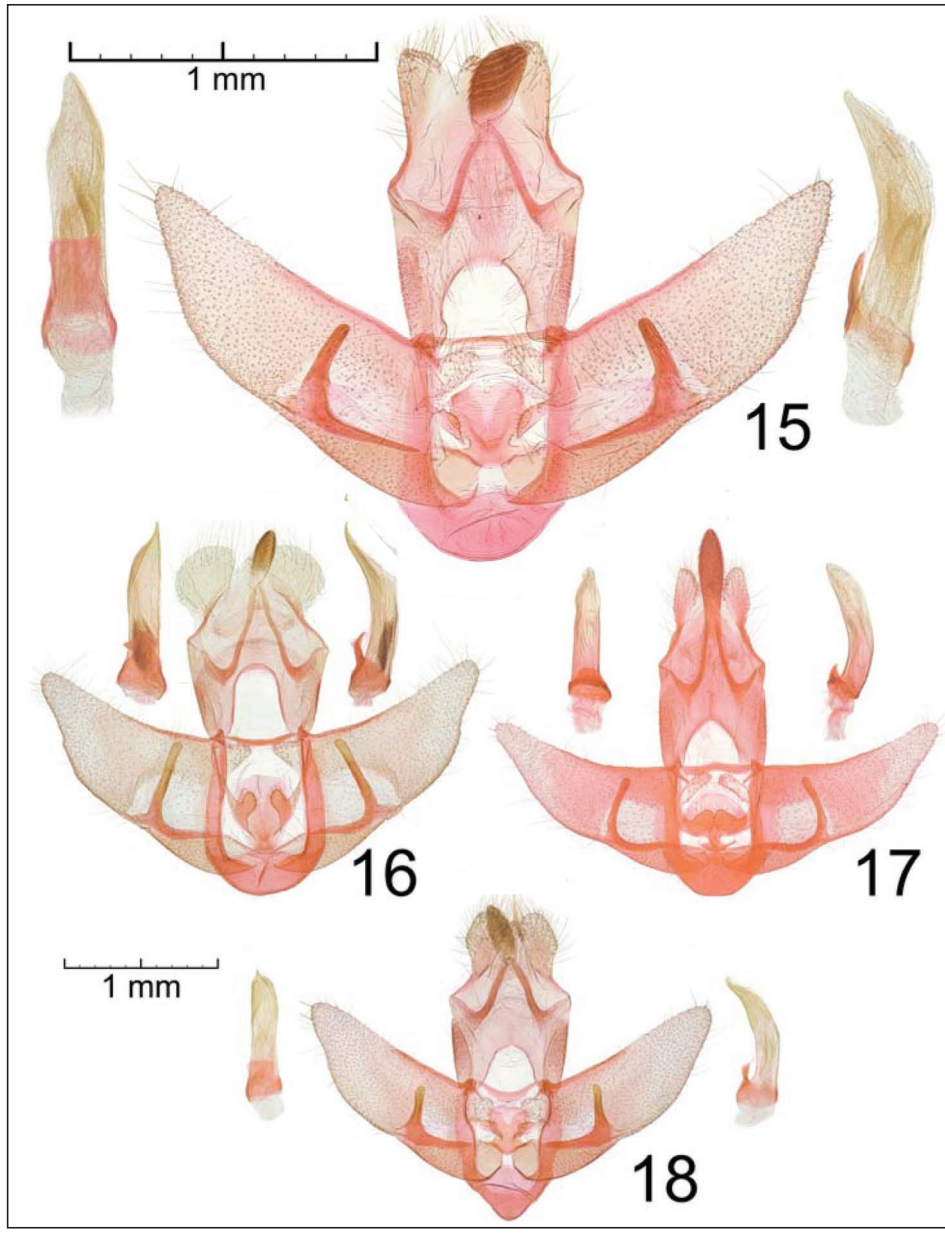


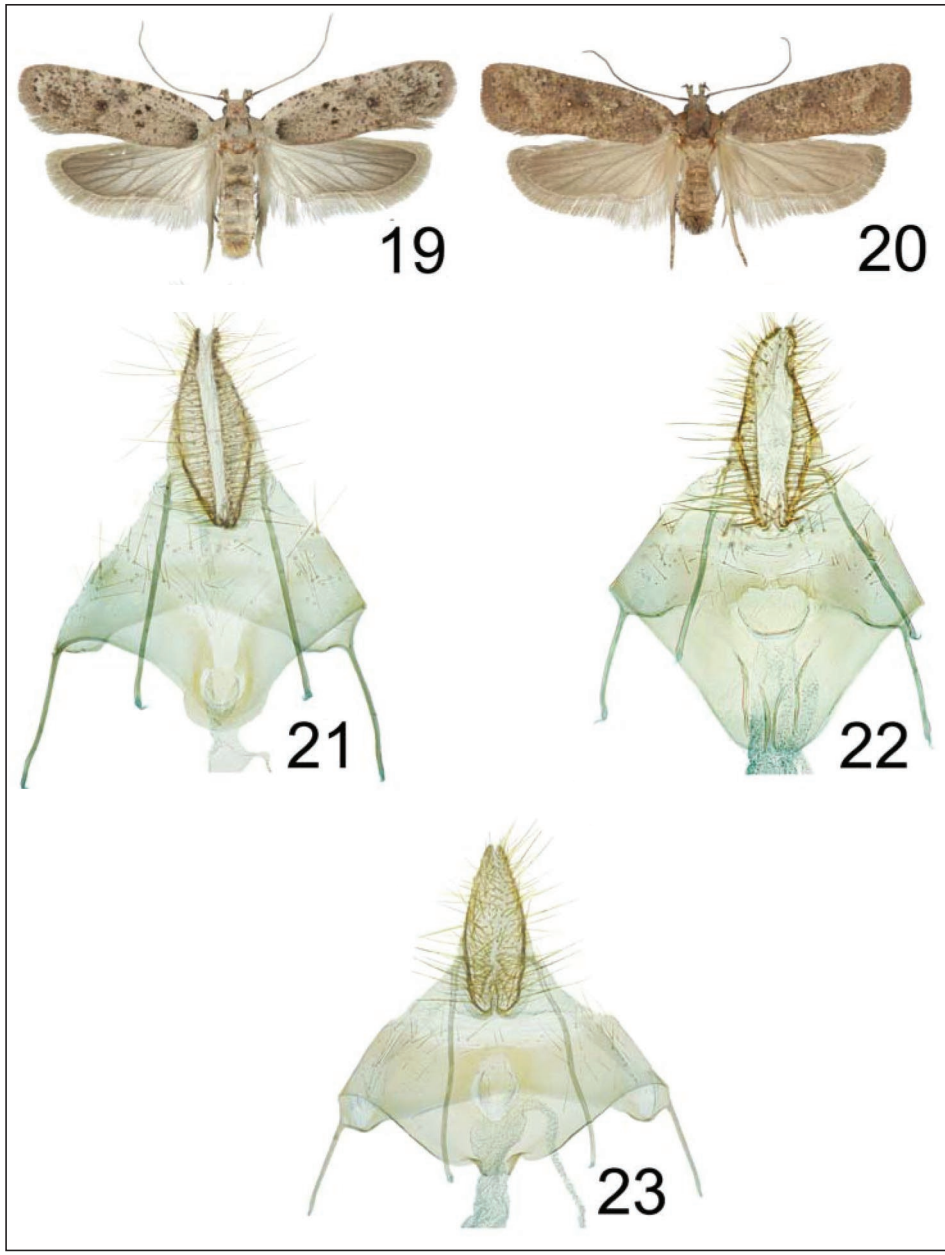
Figs 1-9.– *A. guanchella* Buchner. sp., n. **1.** holotype general view. **2.** paratype DEEUR 4558, general view. **3-9.** holotype, details of wing, head and legs.



Figs 10-14.– *A. guanchella* Buchner, sp. n., female genitalia, holotype. **10-11.** standard embedding (**10.** general view. **11.** segment VIII and papilla analis, detail). **12.** segment VIII not embedded, intersegmental membrane not removed, ventral view, red arrows point at specific distinct rim. **13.** segment VIII not embedded, lateral view. **14.** segment VIII not embedded, but intersegmental membrane removed, ventral view.



Figs 15-18.– Male genitalia, aedeagus shown in ventral view (left) and lateral view (right). **15.** *A. guanchella* Buchner, sp. n., DEEUR 4558, to scale with larger scalebar. **16-18.** further species for comparison, to scale with smaller scalebar. **16.** *A. thapsiella* (Z.), Greece, Kastoria, 13-IX-2014, RCKN. **17.** *A. conciliatella* (Rbl.), Canary Islands, La Gomera, Las Hayas, 27-XII-2018, RCAM. **18.** *A. ocellana* (F.), Russia, Orenburg district, 20-IX-2015, RCKN.



Figs 19-23.– Adult. **19.** *A. thapsiella* (Z.), grey specimen, Greece, Petres, 1-V-2012, NMBE. **20.** *A. conciliatella* (Rbl.), Canary Islands, La Gomera, El Cedro, 26-V-1965, ZSM. Female genitalia. **21.** *A. silerella* (Stt.), Italy, Friuli, 15-VII-2014, RCCM. **22.** *A. subtakamukui* (Lvsk.), Austria, Vorarlberg, 6-VII-1981, TLMF. **23.** *A. thapsiella* (Z.), Greece, Samos, 10-V-2010, NMBE.

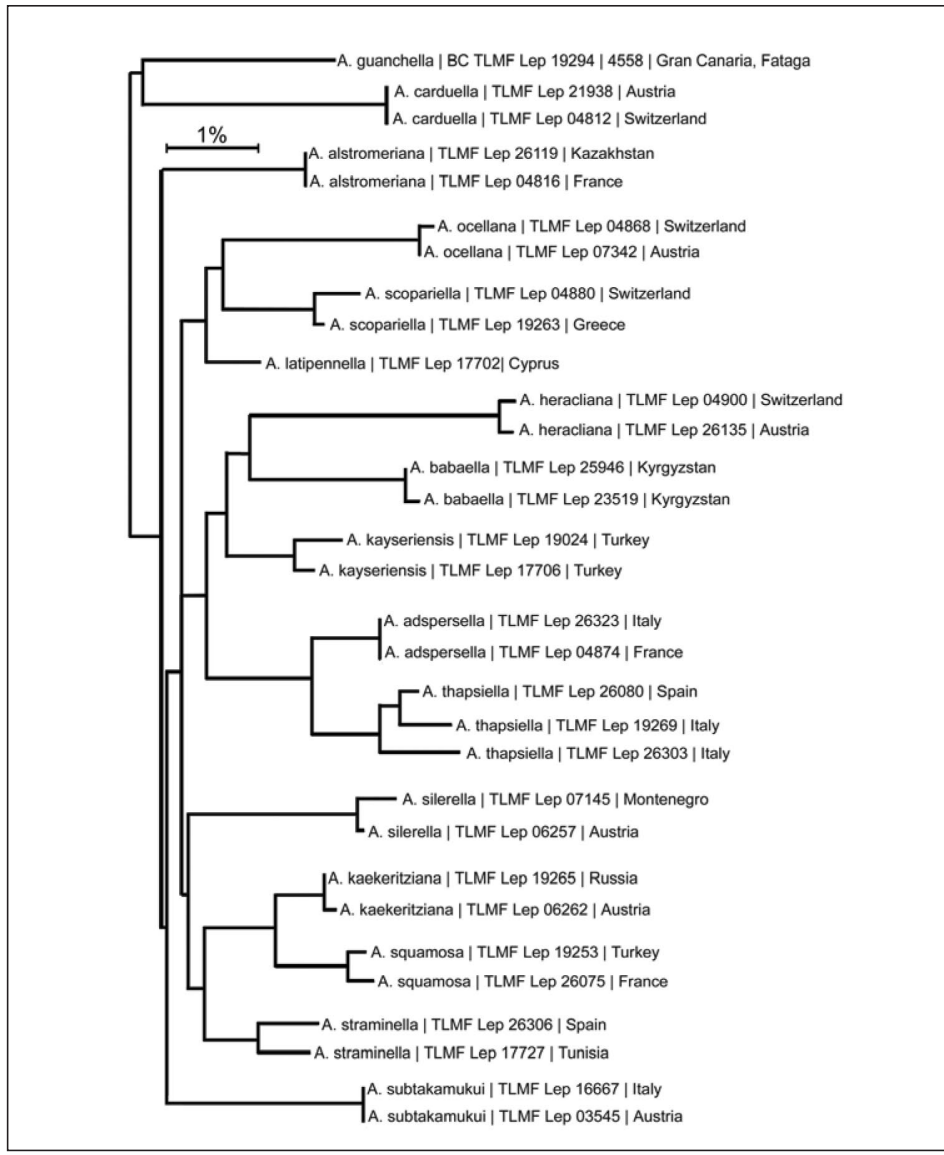


Fig. 24.– Neighbour-joining tree of *Agonopterix guanchella* and selected species and specimens from different species subgroups: *A. adspersella* subgroup (*A. adspersella* (Kollar, 1832), *A. thapsiella* (Zeller, 1847)), *A. alpigena* subgroup (*A. babaella* Amsel, 1972*, A. kayseriensis* Buchner, 2020), *A. alstromeriana* subgroup (*A. alstromeriana* (Clerck, 1759)), *A. arenella* subgroup (*A. carduella* (Hübner, [1817]), *A. ciliella* subgroup (*A. heracliana* (Linnaeus, 1758)), *A. pallorella* subgroup (*A. kaekeritziana* (Linnaeus, 1767)*, A. squamosa* (Mann, 1864)*, A. straminella* (Staudinger, 1859)), *A. ocellana* subgroup (*A. ocellana* (Fabricius, 1775)*, A. silerella* subgroup (*A. silerella* (Stainton, 1865)), *A. takamukui* subgroup (*A. subtakamukui* Lvovsky, 1998), Fabaceae feeding species group (*A. scopariella* (Heinemann, 1870)), species with group not clear (*A. latipennella* (Zerny, 1934)).