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The genus *Clavigesta* (Lepidoptera: Tortricidae) with description of two new species

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Abstract. This paper deals with the genus *Clavigesta* Obraztsov, 1946. The material of the author's collection and some additional material has been examined. Together with the two already known species in this genus, two new species are described and figured: *Clavigesta gerti* **n. sp.** and *Clavigesta tokei* **n. sp.** The distribution of all four species is described in detail and it is detected that all four species occur in the Mediterranean region and that the genus may have originally evolved in the pine forests of this region. *C. purdeyi* from the central Mediterranean area is looking slightly different from the populations in North-West Europe indicating a long time separation of the populations.

Samenvatting. Het genus *Clavigesta* (Lepidoptera: Trotricidae) met beschrijving van twee nieuwe soorten
De exemplaren uit het genus *Clavigesta* Obraztsov, 1946 in de verzameling van de auteur werden, samen met bijkomend materiaal, bestudeerd. Naast de twee bekende soorten uit dit genus, worden twee nieuwe soorten beschreven en afgebeeld: *Clavigesta gerti* **n. sp.** en *Clavigesta tokei* **n. sp.** De verspreiding van de vier *Clavigesta*-soorten wordt in detail besproken en daaruit blijkt dat ze alle vier in het Middellandse Zeegebied voorkomen en dat het genus misschien geëvolueerd is in de pijnbossen van deze streek. Het uiterlijk van *C. purdeyi* van het centrale deel van het Middellandse Zeegebied wijkt af van dat de populaties uit Noordwest-Europa wat duidt op een langdurige scheiding van deze populaties.

Résumé. Le genre *Clavigesta* (Lepidoptera: Tortricidae) avec description de deux espèces nouvelles
Les exemplaires du genre *Clavigesta* Obraztsov, 1946 dans les collections de l'auteur, ainsi que du matériel additionnel, ont été étudiés. En plus des deux espèces connues dans ce genre, deux espèces nouvelles sont décrites et figurées: *Clavigesta gerti* **n. sp.** et *Clavigesta tokei* **n. sp.** La répartition de ces quatre espèces est étudiée en détail et leur présence dans la région méditerranéenne est confirmée. Peut-être que l'origine de ce genre se situe dans les forêts de sapins dans cette région. La morphologie externe de *C. purdeyi* dans la partie centrale de cette région est un peu différente de celle des populations du Nord-Ouest de l'Europe.

Key words. ***Clavigesta sylvestrana* – *purdeyi* – *gerti* – *tokei* – Description – Faunistics – Distribution.**

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Introduction

The genus *Clavigesta* was described by Obraztsov in 1946 with *Spilonota sylvestrana* Curtis, 1850 as genotype. The wing venation is very close to *Rhyacionia* Hübner, 1825 and the differentiation of the genus is mainly based on the form of the valve with the characteristic long and slender neck and the ball-shaped cucullus (Obraztsov 1946). The genus was redescribed by Razowski (1989) mentioning more dissimilarity in the wing venation and genitalia, but more authors conclude that the only characteristic of the genus is the shape of the valve (Obraztsov 1964, Razowski 1989). The wing venation is figured in Obraztsov (1964).

Beside *C. sylvestrana* only one other species of the genus is known: *C. purdeyi* (Durrant, 1911). Both species were described from type localities in England. In contradiction to this, the distribution of the genus is called Holarctic by Razowski (1989, 2003). The distribution of the genus in the South-Western and Mediterranean part of the Palaearctis will be discussed.

A large number of specimens of *Clavigesta* have been examined and as a consequence two new species are discovered and described and information on the distribution of the four species is given.

Terminology for genitalia follows Pierce & Metcalfe (1960) and Razowski (2003).

Abbreviations:

BMNH	The Natural History Museum, London, England.
DEMV	Department of Entomology, Museum of Victoria, Melbourne.
KL	Collection of Knud Larsen, Denmark.
LMKK	Landesmuseum Kärnten, Klagenfurt, Austria.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria.
ZMUC	Zoologisk Museum, Natural History Museum of Denmark, Copenhagen.

Clavigesta sylvestrana (Curtis, 1850) (Figs. 1, 2, 10, 14)

Spilonota sylvestrana Curtis, 1850. Annals and Magazine of natural History (2)5:111. Type locality: England: Bournemouth. Syntypes: DEMV (Brown 2005).

Retinia pollinis Millière, 1874. Revue et Magasin de Zoologie pure et appliquée 3(2): 251. Type locality: France: Cannes. Syntypes: MNHN (Brown 2005).

Material examined. **France** (mainland). 1♂ 2♀ Bayonne: Hossegor, Plage de Casernes, 8.–9.vii.1992 (M. Fibiger leg., KL coll.); 1♂ 1♀ Gard: Aigues-Mortes, 3.vii.1988; 3♂ 1♀ Girondes: Carcans-Plage, 28.vii.1991; 1♂ Var: Col de Vignon, 500 m, 30.v.1989; 4♂ Var: Gorge du Verdon, 800 m, 21.vii.1991; 2♂ Var: Col d'Illoire, 1000 m, 30.vi.1994; 13♂ 2♀ Var: Aups, 4. & 6.vii.1996, gen.

slide 1183♀ KL; 1♂ Var: Châteaudouble, 600 m, 14.vii.1999; 3♂ 3♀ Var: La Garde-Freinet, 400 m, 19.vii.1999 (KL leg. et coll.).
Corsica. 3♂ 2♀ Aisne: Haute-Corse, 4 km S. Ghisoni, 700 m, 18.vii.2004; 2♂ 2♀ Aisne: Haute-Corse, 5 km SW Asco 14. & 17.vii.2004, gen. slide 1192♂ KL; 2♂ Aisne: Haute-Corse, Haut-Asco, 1450 m, 17.vii.2004; 7♂ 2♀ Aisne: Haute-Corse, Bastia, Plage de Marana, 7.–8.vii.2004, gen. slides 1173♂ & 1191♀ KL (KL leg. et coll.).
Spain. 2♀ Andalusia: Almeria, Tabernas, 380 m, 6.–8.vii.2007; 1♂ 1♀ Andalusia: Granada, Almunecar, 1.–11.vii.2007; 3♂ 4♀ Andalusia: Granada, Sierra de las Guájares, 1160 m, 3.–12.vii.2007, gen. slide 1172♂ KL; 1♂ Andalusia: Granada, Sierra de Chaparrel, 900 m, 5.–6.vii.2007 (G. Jeppesen leg., KL coll.); 1♂ Andalusia: Granada, Sr. de Huelor, Ventas del Molinillo, 20.vi.2001 (W. Schmitz, leg., KL coll.); [Aragon], Teruel: Val de Vecar at Albarracin, 1200 m, 40°25′30″N, 01°27′05″W, 4.viii.2007 (B. Skule & P. Skou leg., KL coll.).
Italy. 6♂ 2♀ Campani, Vesuvio, 23.–27.vii.1933, gen. slides 1178♂ KL & 1184♀ KL (G. Langohr leg., KL coll.).
Greece. 1♂ Loutra, Kilini, Patras, 0 m, 28.vi.2007, gen. slide 1188♂ KL (Viehmann leg., KL coll.).

Description. Imago. Wing span 12–16 mm. Antennae light grey, ringed with black; segments conical. Labial palps dark grey at outer side and plain light grey at inner side. Head, thorax and tegulae grey with white tippet scales. Abdomen more plain dark grey and the last segment in the male with long whitish scales like a collar around the genitalia. Ground colour of forewing light grey, strongly striped with irregular darker grey transverse striae; terminal part of wing often ferruginous dark brown; basal blotch dark grey, sharply edged; tornal blotch diffuse, tiny and rather light with the outer edge more defined; cilia grey with a blackish sub-basal line. The females are normally bigger than the males. There is only slight variation mainly in the level of the ferruginous colorings. Hind wings grey with cilia of same colour and with a dark sub-basal line.

Male genitalia. Angle of sacculus pointed, neck of valve very slender and of same size or longer than cucullus. Cucullus oval, more rounded at costa, and with many rather strong thorns, strongest at the edge. Aedeagus with about 5 long and slender cornuti. These are sometimes lost.

Female genitalia. Seventh segment strongly sclerotized and deeply indented around ostium, formed like a collar. Cingulum very large and broader towards bursa. Two long, slender, tapered signa of different size.

Biology. The head, ocelli and prothoracic plate of the larva is dark blackish brown. The body is ochreous, tinged with purplish brown and with darker legs. Several species of *Pinus* are mentioned as food plant. Feeding from August to May in shoots, buds and male flowers, living in a silken gallery. It pupates in May–June in a tough silken cocoon at the base of the flower near the larval habitation. (Bradley *et al*. 1979, Emmet 1988).

Also *Picea* is mentioned as food plant but no authors describe the mode of living of the species in *Picea*. Kennel (1921) gives *Pinus picea* as food plant and after that, this is repeatedly cited in the literature. This needs exact confirmation.

The imago flies in June and July in late afternoon and comes later freely to light. The 84 specimens in the author's collection are taken from the 30th of

May to the 4th of August with far the most specimens from the end of June till the end of July. The species occurs from sea level to an altitude of 1450 m.

Distribution. Atlantic–Mediterranean. The species is known from the following countries: England: Southern third including the Isles of Scilly (Bradley *et al.* 1979); Ireland (Bond 1996); Netherlands: several localities but rare (Kuchlein 1993); Germany: Brandenburg, Nordrhein-Westfalen, Saarland; all records are from before 1980 (Gaedike & Heinicke 1999); Channel Islands, Belgium, France, Corsica, Andorra, Spain, Italy, Switzerland, Madeira (Aarvik 2007); Azores: Terceia, Pau Velho, 22.vi.1981 (Passos de Carvalho 1992); Greece: Loutra Kilini, Patras, 0 m, 28.vi.2007 (Viehmann leg., coll. K. Larsen). Karanikola & Markalas (2001) record the species from the Thessaloniki area in Greece but due to possible confusion with the next species confirmation of the identification is needed.

Furthermore, the Balearic Islands, Canary Islands, Portugal and Sicily are mentioned (Aarvik 2007). Due to possible confusion with the next species and the lack of available material the records from these areas need confirmation.

Bradley *et al*. (1979) mentions the species from the USSR and North America. None of these records can be confirmed and thus should not be cited. According to Sinev (2008), the genus *Clavigesta* is not found in Russia. The species was recorded by Soffner (1960) from the Czech part of the Krkonose Mountains in Bohemia, but due to no reliable records the species was removed from the Czech list by Jaros (Jaros 2004, pers. comm.).

Remarks. In Kennel (1921: pl. XV, fig. 47) the synonym *pollinis* Millière, 1874 is pictured. The description by Millière (1874) and the picture in Kennel confirm the synonymy.

Clavigesta purdeyi (Durrant, 1911) (Figs. 3, 4, 5, 11, 15)

Rhyacionia purdeyi Durrant, 1911. Entomologist's Monthy Magazine 47: 252. Type Locality: England: Kent, Folkestone. Syntypes BMNH (Brown, 2005).

Material examined. **Denmark**. 1♀ WJ: Hvide Sande, 26.viii.–1.ix.2005 (K. Larsen, B. Martinsen & D. Stilhoff leg., KL coll.); 5♂ 2♀ Blåvand, 16.vii.–12.viii.2005 (KL leg. et coll.); 1♂ F: Stige, 18.vii.1999 (O. Buhl leg., KL coll.); 1♀ LFM: Råbylille Strand, 5.–27.viii.2000 (D. Stilhoff leg., KL coll.); 1♂ Hesnæs, 2.viii.2003; 4♂ 3♀ Gedser, 21.–23.vii.2003; 1♂ Bøtø, 31.vii.–7.viii.2006; 28♂ 9♀ Gedesby, 18.vii.–19.viii.1999–2006; 1♂ 3♀ NWZ: Rønsnæs, Ulslev, 6.viii.2009; 7♂ 3♀ NEZ: Søborg, 12vii.–23.viii.2002–2008, gen. slide 1182♀ & 1185♀ KL (KL leg. et coll).
Netherlands. 1♀ NBr. Leende, Leenderbos, 6.viii.2002 (F. Groenen leg. et coll.).
France (mainland). 1♂ Alpes de Haute Provence, Naverre, 1000 m, 29.vii.2001 (KL leg. et coll.); 1♂ Hautes Alpes, 2 km SE Vallouise, 1150 m, 29.vii.2006; 2♂ Hautes Alpes, 2 km S Prelles, 30.vii.2006 (P. Skou leg., KL coll.).
Corsica. 1♂ 1♀ Aisne: Haute-Corse, 4 km S Ghisoni, 700 m, 18.vii.2004 (gen. slide 1186♀ KL); 2♂ 1♀ Col de Sorba, 19.vii.2004, gen. slide 1189♀ KL; 1♂ 5 km SW Asco, 750 m, 17.vii.2004, gen. slide 1195♂ KL; 1♂ Haut-Asco, 1450 m, 17.vii.2004, gen. slide 1193♂ KL (KL leg. et coll.); 13 sepcimens Col der Vergio, 1400–1500 m, 14.–15.viii.1998; 5 specimens Evisa, 900 m, gen. slide 5156 KL (O. Karsholt leg., ZMUC).
Spain. 1♂ Cuenca, Tragacete, 1500 m, 18.viii.1981, gen. slide 1181♂ KL (W.O. De Prins leg., KL coll.); 1♂ Barcelona, 3 km NW Gurb, 550 m, 15.viii.2001 (P. Skou leg., KL coll.); 3♂ Barcelona, 2 km W Sant Marti de Tous, 550 m, 16.viii.2001 (B. Skule & P. Skou leg., KL coll.); 1♂ Castellon,

Cinctorres 15.viii.2002, gen. slide 1175♂ KL (B. Niemeyer leg., KL coll.); 1♂ [Catalonia] Pyrenäen. Espot, Jou, 1500 m, 15.viii.2003 (Viehmann leg., KL coll.). [Andalusia]. Granada: Sierra Nevada, Las Viboras, 1700 m, 37°07′23″N,3°27′11″W, 31.viii.–1.ix.2001, gen. slide 1198♂ KL (B. Skule & C. Hvid leg., KL coll.).
Andorra. 1♂ Arnisal, 1500 m, 1.viii.1997 (J.P. Baungaard leg., ZMUC).
Italy. 1♂ 1♀ Calabrien, Longobucco, 3.viii.1982, gen. slides 1057♂ & 1063♀ F. Groenen (J.H. Kuchlein leg.).

Description. Imago. Wing span 11–14 mm. Antennae grey, strongly ringed with black. Segments strongly conical. Palps rather small, brownish grey with a lighter inner side. Head dark grey, lighter in center and thorax, tegulae dark brownish grey. Abdomen grey with a little longer scales on last segment.

Fore wing elongate with a slightly curved costa. Ground colour grey with blackish transverse lines at the inner two thirds. Basal blotch edged darker grey. Median fascia darker towards termen, sharply dark edged. Termen rather plain orange with a smaller or bigger area of black scales placed at the tornal spot. Edge of termen white with a black sub-basal line. Cilia dark grey or blackish.

The species is normally very easy to recognize but in South Europe the picture is much more mixed. The ground colour can be ferruginous also at the inner two thirds or just plain grey-brown. This makes the division to the terminal part less distinct. The tornal spot has many black white tippet scales and often there is a black spot in center of termen. This form resembles the dark form found in Denmark and pictured as a dark form of *C. purdeyi*, later unfortunately wrongly recorded as *C. sylvestrana* (Buhl *et al*. 1998, 2002).

Hind wings plain dark brownish grey with cilia of the same colour and with a dark sub-basal line.

Male genitalia. Angle of sacculus pointed, neck of valve very slender and of same size or shorter than cucullus. Cucullus big and rounded, especially at costa, width and length nearly of the same size. There are many rather strong thorns at the edge while those at the center of cucullus are more hair-like. Aedeagus with about 5 slender cornuti which are broad at the base and curved, but not always present.

Female genitalia. Seventh segment sclerotized and deeply indented around ostium. It is U-shaped and stronger sclerotized at the top. Cingulum rather large and divided towards bursa, sometimes tipped towards ostium. Two long, slender signa of different size and tapered.

Biology. Eggs are deposited singly on the needles, usually near the tip. The larva is reddish brown occurring from September to June–July. Several species of *Pinus* are mentioned as food plant. The larva mines in the needle until October. After hibernation it moves to the new shoots boring through the sheaths into the needle bases. The needles can fall of and the trees can be slightly defoliated. The larva pupates in a loosely spun cocoon attached to the needles (Bradley *et al*. 1979).

The imago flies from July till September in late afternoon and comes later freely to light. The 90 specimens in the author's collection are taken from the

12th of July to the 1st of September with far the most specimens from the end of July to mid August. The species occurs from sea level to an altitude of 1700 m.

Distribution. Atlantic–Mediterranean. The species is known from the following countries: England: Southern half including Wales and the Isles of Scilly (Bradley *et al*. 1979); Ireland (Bryant 2007); Netherlands: widespread (Kuchlein 1993); Denmark: widespread; Germany: most western provinces (Rennwald & Rodeland 2004); Channel Islands, Belgium, Luxembourg, France, Spain, Switzerland (Aarvik 2007); Italy (Huemer *et al*. 2005), and the author has recorded the species from the Spanish mainland: Andalusia, Cuenca and Castellon and also from Andorra, Corsica and Italy: Cantabria.

Razowski (2003) records *C. purdeyi* from Finland, but the species is not found there.

Remarks. The species was prior to 1927 only known from a few localities in southern England. In the last half of the century it has spread to the north in England (Bradley *et al*. 1979), and at the same time expanded at the west coast of Europe and can now be found from Spain to Norway. In the last 10 to 15 years it has also expanded to inland localities in Germany, France, North Italy and Switzerland. The findings from Corsica, southern Italy and southern Spain could indicate that the species is expanding further or that it has older "relict" populations in some mountainous regions of the Mediterranean area. The populations from Corsica and southern Italy are also slightly different in both imagines and genitalia but not enough to give basis for creating new species or subspecies. Due to the variability of C. purdeyi, it is recommended to study the genitalia in order to give exact distributional information.

Clavigesta gerti Knud Larsen, **new species** (Figs. 6, 7, 12, 16)

Type material. Holotype ♂, **Spain**, Balearic Islands, Mallorca: Ca'n Picafort, 23.–25.ix.2009, gen. slide 1176♂ KL (KL leg., ZMUC).

Paratypes: 2♂ 1♀ same data as holotype, gen. slide 1190♀ KL (KL leg. et coll.); 1♀ Spain, Balearic Islands, Ibiza: Cala Carbó, la. *Pinus halepensis*, 17.v.1993, gen. slide 1187♀ KL (KL coll.); 12♂ Spain, Andalucia: Malaga; Almunecar 150 m, 22.–27.x.2000, gen. slide 1174♂ KL; 2♂ Almunecar, 135 m, 1.–11.vii.2007, 1♂ Almunecar 10.–27.iv.2008, gen slide 1194♂ KL (G. Jeppesen leg., KL coll.); 1♀ Spain, [Andalucia], Almeria: Cabo De Gata, 21.x.2003, gen. slide 1179♀ KL (Viehmann, leg., KL coll.); 1♂ Spain, Murcia, Sierra de Espuna, 4 km N Aledo, 37°49′ N 1°34′45″W, 14.ix.1999, gen. slide 1048♂ F. Groenen (C. Gielis & J. Asselbergs leg., F. Groenen coll.); 3♂ Spanien, Alicante, Umg. Denia, 18. & 24.viii.2002, gen. slide 1197♂ KL (W. Schmitz leg., KL coll.); 1♂ Alicante, Parcent, 500 m, 6.x.2008 (H. Rietz leg., H. Roweck coll.); 1♂ 1♀ Spain, Huesca, 8 km S of Candasnos, Barranco de Valcuerna, 175 m, 13.–14.ix.2002, gen. slides 4488♂, 4489♀ H. Hendriksen (P. Skou leg., ZMUC); 1♂ Spain, [Huesca], Teruel: Moscardon, 1500 m, 14.ix.2007 (Viehmann leg., KL coll.); 1♂ 1♀ Castellon: Penyagolosa N-Hang, Banyadera, 1500 m, 40°12,74'N 00°20,89'W, 31.viii.–1.ix.2005; 1♂ Alicante: Alcoj, Font Roja, NW El Menejador, 960 m, 38°39,88'N 00°31,66'W, 3.ix.2005; 1♂ Valencia: El Saler, Albufera, 5 m, 39°19,67'N 00°18,47'W, 8.ix.2005 (Huemer leg., TLMF), det. P. Huemer; 1♂ Castellon: Penyagolosa E, 1.ix.–2.ix.2005, 1450 m GEO-WGS84, -0,3435W 40,2490N; 10♂ 1♀ Alicante: Alcoj, Benimarfull, 17.ix.2004, 600 m, UTM-WGS84, -0,34006W 38,78223N; 1♂ Valencia: Albufera, 8.–9.ix.2005, 5 m, 0°18,46'W 39°19,67' N (C. Wieser leg., LMKK), det. P. Huemer.

France. Corsica. 1♂ Aisne: Haute-Corse, Haut-Asco, 1450 m, 17.vii.2004, gen. slide 1177♂ KL (KL leg. et coll.); 1♂ Bonifacio, 23.ix.2003, gen. slide 5164 KL (P. Skou leg., ZMUC).

Diagnosis. The species differs from the other *Clavigesta* species by the irregular grey ferruginous scattered ground colour, termen more whitish edged with two spots interrupting the black sub-basal line. It also differs by having more tipped hind wings. The neck of the valvae is less slender than in *C. sylvestrana* and *C. purdeyi*. From those species *C. gerti* also differs in the cucullus which is long, oval and without the abrupt connection to the neck. From *C. tokei* it differs with a longer neck and more narrow cucullus. The female genitalia differ by having one very large cornutus and one very tiny. From *C. tokei* it also differs in the ostium which is small and rounded. The seventh segment is weaker sclerotized and pointed.

Description. Imago. Wingspan 11–13 mm. Antennae grey, strongly ringed with black. Segments strongly conical. Palps rather small, brownish grey with white tipped scales. Head, thorax and tegulae plain grey. Abdomen more plain light grey and the last segment in the male with long whitish scales like a collar around the genitalia. Ground colour ferruginous mixed with smaller black areas, and as the scales are white tipped the impression is given of a very irregularly colored species. Basal blotch darker grey edged. Median fascia darker towards termen dark edged followed by a whitish area in termen. Termen with a black area in the center, otherwise colored more ferruginous. Edge of termen white with a black sub-basal line interrupted twice with white. Two white costal strigulae. Cilia dark grey or blackish. Hind wings plain brownish grey with whitish cilia and with a dark sub-basal line. The hind wings are bend inwardly at dorsum, then the wings become more tipped.

Male genitalia. Angle of sacculus strongly pointed; neck of valve broadening towards cucullus and of same size as cucullus. Cucullus oval, long stretched, twice as long as broad. There are many rather long and strong thorns at the edge while those at the center of cucullus are more hair-like. Aedeagus with about 3 slender, long and slightly curved cornuti, but not always present.

Female genitalia. Seventh segment sclerotized and deeply indented around ostium. It is circular shaped and stronger sclerotized at the top pointed against ostium. Cingulum smaller than in the other species and tipped towards ostium. Two signa, one very large, slender and tipped nearly crossing the width of bursa and the other very tiny, only visible in higher magnification.

Biology. The species has been reared from *Pinus halepensis*, found on 17th of May 1993 on Ibiza. The imago is mainly taken at light and can be common, occurring from sea level to an altitude of 1450 m. The flight period seems to be spread over the summertime at least in three broods, April, July–August and September–October and it is probably most common in the autumn.

Distribution. Mediterranean. The species seems to be mainly coastal, occurring in the north-western half of the Mediterranean area: France, Corsica: Aisne; Spain: Balearic Islands and southern coastal parts of the mainland: provinces Andalusia, Murcia, Alicante and Huesca.

Remarks. Etymology. The species is named after my good colleague Gert Jeppesen, who has provided me with a large part of the type series and a large amount of Tortricidae from Spain.

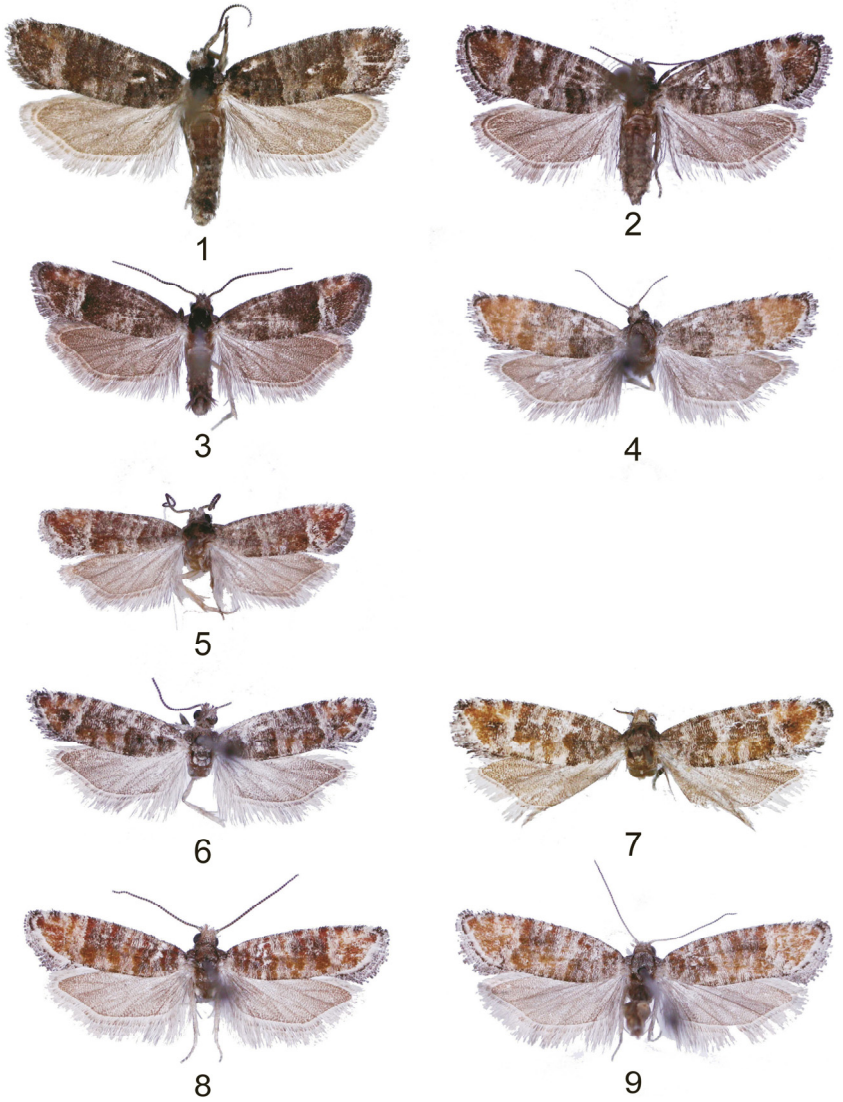
Clavigesta tokei Knud Larsen, new species (Figs. 8, 9, 13, 17)

Type material. Holotype ♂, **Turkey**, Antalya: Alanya, 12 km N, 600 m, 6.x.1995, gen. slide 1171♂ KL (KL leg, ZMUC).
Paratypes. 31♂ 3♀ same data as holotype, gen. slides 1196♂ KL, 3701♂ KL & 1180♀ KL (KL leg. et coll.); 2♂ **Greece**, Rodos, Profitis Illias, 500 m, 6.x.1999, gen. slide 1171♂ KL (C. Szabóky leg., KL coll.); 1♂ Greece, Thassos, Pefkari, 0 m, 14.–17.vii.1990, gen. slide 1199♂ KL (M. Fibiger leg., KL coll.); 1♂ Greece, Serrés, 2 km W Angistro, 250 m, 30.viii.2008, gen. slide 1200♂ KL (P. Skou leg., KL coll.).

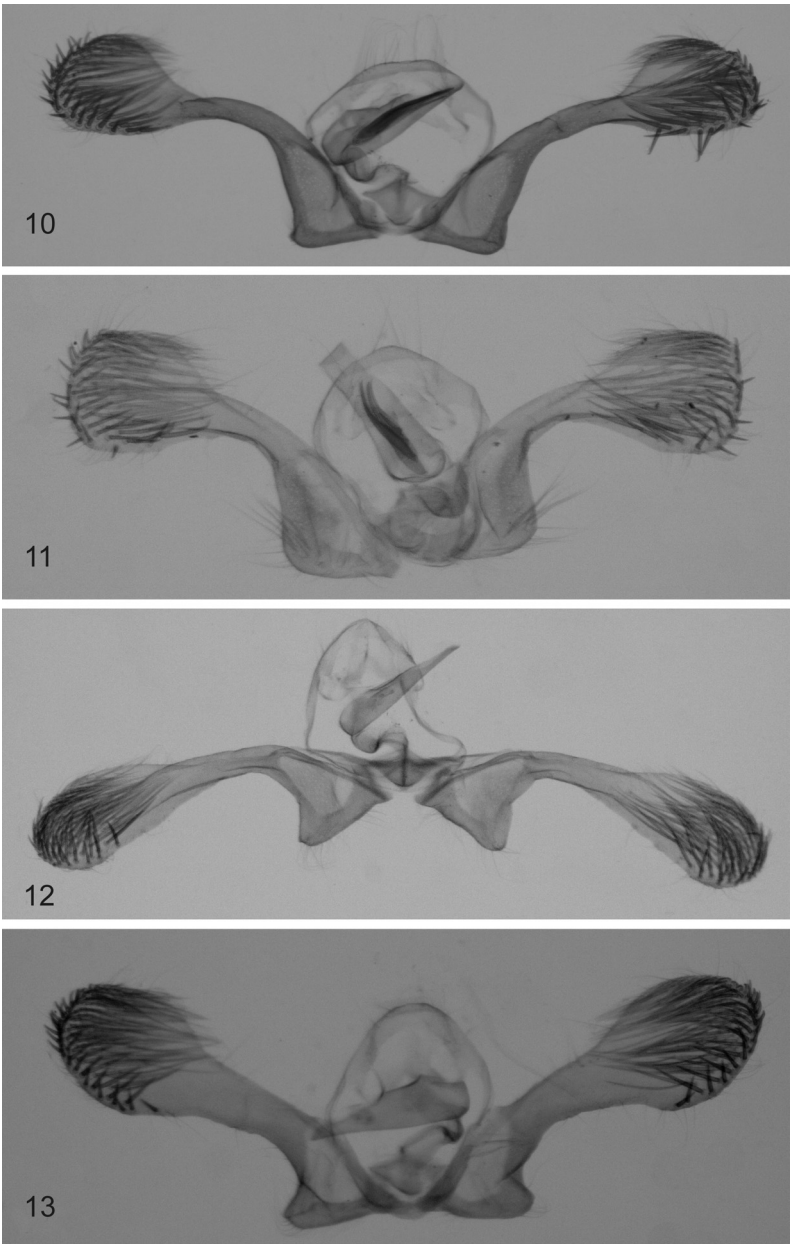
Diagnosis. The species differs from the other *Clavigesta* species by the irregular orange ground colour interrupted by several grey transverse bands. The basal part and the first two thirds of costa are darker orange, while the last two thirds of dorsum and termen are light orange. Inner third of cilia white and outer two thirds consist of three rows of black scales. It also differs by having more tipped hind wings. The valvae is much shorter than in the other three species and the neck of the valvae is less slender than in *C. sylvestrana* and *C. purdeyi*. From those species *C. tokei* also differs in the cucullus which is equally oval and without the abrupt connection to the neck. From *C. gerti* it differs with a shorter neck and a more equally rounded cucullus. The female genitalia differ by having one very large cornutus and one tiny one which is twice as big as in *C. gerti*. From *C. gerti* it also differs in the ostium which is bigger and in the cingulum which is irregularly pointed towards ostium. The seventh segment is stronger sclerotized and less pointed than in *C. gerti*.

Description. Imago. Wingspan 12–14 mm. Antennae light orange, strongly ringed with black. Segments strongly conical. Palps rather small, orange. Head orange. Thorax and tegulae dark orange mixed with grey. Scales are brighter tipped. Abdomen more plain light orange grey and the last segment in the male with long whitish scales like a collar around the genitalia. Ground colour orange interrupted by several grey transverse bands. The basal part and the first two thirds of costa darker orange while the last two thirds of dorsum and termen is light orange, whitish towards median fascia. The median fascia is terminal edged with more waves. Inner third of cilia white and outer two thirds consist of three rows of black scales. Hind wings inwardly bended at dorsum, then the wings become more tipped. There is a dark sub-basal line.

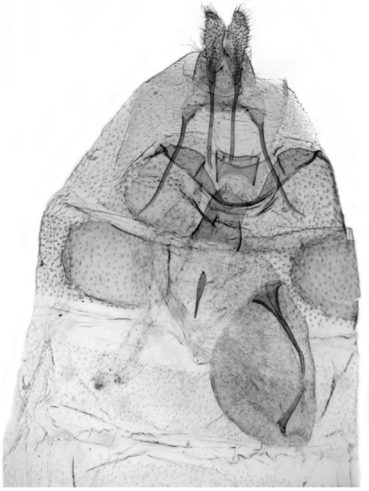
The variation is slight but the two specimens from northern Greece are darker and less orange.



Figs. 1–9. Imagines of *Clavigesta* species. **1**.– *Clavigesta sylvestrana* (Curtis, 1850) ♂, France: Var; **2**.– Idem ♀, France: Var; **3**.– *Clavigesta purdeyi* (Durrant, 1911) ♂, Denmark: Funen; **4**.– Idem ♀, Denmark: Falster; **5**.– Idem ♂, France: Corsica; **6**.– *Clavigesta gerti* **n. sp.** ♂ Holotype, Spain: Mallorca; **7**.– Idem ♀, Spain: Ibiza; **8**– *Clavigesta tokei* **n. sp.** ♂ Holotype, Turkey: Antalya; **9**.– Idem ♀, Turkey: Antalya. (Photo K. Larsen).



Figs. 10–13. Male genitalia of *Clavigesta* species. **10**.– *Clavigesta sylvestrana* (Curtis, 1850), gen. slide 1172 KL; **11**.– *Clavigesta purdeyi* (Durrant, 1911), gen. slide 1175 KL; **12**.– *Clavigesta gerti* **n. sp.,** gen. slide 1174 KL; **13**.– *Clavigesta tokei* **n. sp.**, gen. slide 1170 KL. (Photo T. Garrevoet).



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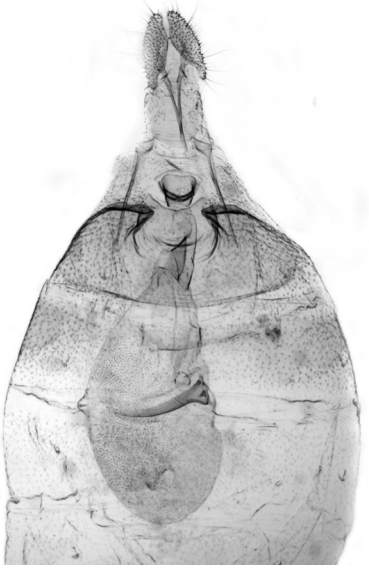

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Figs. 14–17. Female genitalia of *Clavigesta* species. **14**.– *Clavigesta sylvestrana* (Curtis, 1850), gen. slide 1184 KL; **15**.– *Clavigesta purdeyi* (Durrant, 1911), gen. slide 1186 KL; **16**.– *Clavigesta gerti* **n. sp.**, gen. slide 1187 KL; **17**.– *Clavigesta tokei* **n. sp.**, gen. slide 1180 KL. (Photo J. De Prins).

Male genitalia. Valva short and angle of sacculus strongly pointed, neck of valva broadening towards cucullus and of same size as cucullus. Cucullus slightly oval, a little longer than broad, edged with a row of stronger thorns; the other part is more hairy. Aedeagus small and pointed, with three long, spatula-shaped cornuti, but the cornuti can often be absent.

Female genitalia. Seventh segment sclerotized and deeply indented around ostium, which is half-moon-shaped. The segment is nearly circular shaped and stronger sclerotized at the top. Cingulum rather big and irregularly tipped towards ostium. Two signa, one very large, slender and tipped, nearly crossing the width of bursa, and the other very tiny but visible in lower magnifications.

Biology. The food plant is not known, but the species is found at coastal habitats with *Pinus* forest. The imago is taken at light and can be very common occurring from sea level to an altitude of 600 m. The flight period is June, July and October.

Distribution. Mediterranean. The species seems to be mainly coastal in the north-eastern half of the Mediterranean area: Greece: Macedonia, Thasos, Rhodes; Turkey: province Antalya.

Remarks. Etymology. The species is named after my son Toke Zandersen, who has kindly followed me during many long distance collecting travels.

This *Clavigesta* species resembles superficially a small *Rhyacionia* species and could be misunderstood as such.

Discussion

This study of the genus *Clavigesta* has revealed that it consists of at least four species and that all four species occur in the Mediterranean area. Thus the type localities from England of the two formerly described species do not mean that they originally have evolved there. This very special genus obviously has evolved at sea shore forests in the Mediterranean basin as there are no findings of members of this genus in other parts of the world. The occurrence of *C. purdeyi* in Corsica, central and southern Spain and southern Italy, compared with the completely separate population in southern England and the difference in the external morphology of the imagines mean that the populations must have been separated since a very long time. The occurrence of *C. sylvestrana* on Madeira and Azores could be due to introduction.

The south-western part of England has had a very mild climate during the last ice ages and thus the populations of *C. purdeyi* could have survived that period in South England as well as in the Mediterranean basin.

The conformity between *C. gerti* and *C. tokei*, both in genitalia and external morphology, makes them twin species. *C. sylvestrana* and *C. purdeyi* are rather alike in the male genitalia but not in the female genitalia and in the external morphology and thus they do not seem to be twin species. *C. purdeyi* from Corsica can be nearly impossible to separate from *C. gerti* from the same locality and in fact three of the four *Clavigesta* species occur at the same mountain on Corsica, which is a very species-rich locality with open pine tree forest. The

female genitalia of *C. purdeyi* have the same structure as is seen in *C. gerti* and *C. tokei*. *C. purdeyi* thus seems to be the only species that has affinities to the three other species, and thus it could be the oldest of the four species.

Further investigations in the Mediterranean area could reveal more species in this genus and a wider distribution of perhaps all of the species.

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