A new species of *Agonopterix* feeding on giant hogweed (*Heracleum mantegazzianum*) in the Caucasus, with a discussion of the nomenclature of *A. heracliana* (Linnaeus) (Depressariidae)

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Abstract. *Agonopterix caucasiella* sp. n. is described and compared with its closest relatives, *A. ciliella* (Stainton, 1849) and *A. heracliana* (Linnaeus, 1758). Adults and genitalia of these species are figured. The life history of *A. caucasiella* sp. n. in the Caucasus is described. Its larva feeds in the umbels of *Heracleum mantegazzianum* Sommier & Lévier (Apiaceae) (giant hogweed), an invasive weed in Europe, which is moreover toxic to human skin. The complicated and controversial nomenclature of the related *A. heracliana* (Linnaeus) (*Phalaena* (*Tortrix*)) is discussed, as is that of *Depressaria heracliana* (Linnaeus) sensu auctt. For the latter the name *D. radiella* (Goeze, 1783) is valid, whereas *D. heraclei* (Retzius, 1783) is shown to be invalid. A lectotype is designated for *Pyralis applana* Fabricius, 1777. *Phalaena radiella* Goeze, 1783 is fixed as the type-species of *Depressaria* Haworth, 1811.

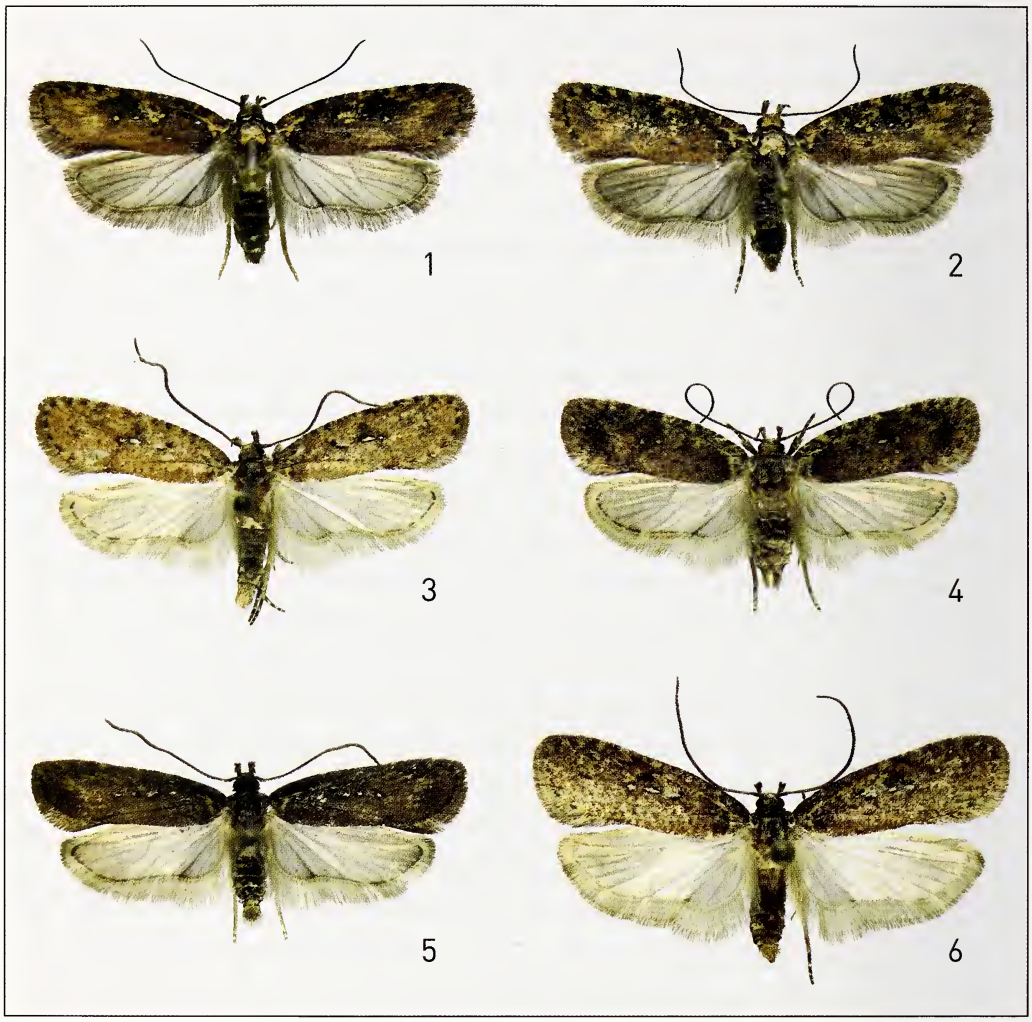
Zusammenfassung. *Agonopterix caucasiella* sp. n. wird beschrieben und mit ihren nächsten Verwandten *A. ciliella* (Stainton, 1849) und *A. heracliana* (Linnaeus, 1758) verglichen. Die Falter und die Genitalien dieser Arten werden abgebildet. Die Lebensweise von *A. caucasiella* sp. n. im Kauskaus wird beschrieben. Ihre Larven fressen an den Dolden von *Heracleum mantegazzianum* Sommier & Lévier (Apiaceae) (Riesenbärenklau), ein Neophyt in Europa, welcher für die menschliche Haut giftig ist. Die komplizierte und widersprüchliche Nomenklatur der verwandten *A. heracliana* (Linnaeus) (*Phalaena* (*Tortrix*)) wird diskutiert, genauso wie *Depressaria heracliana* (Linnaeus) sensu auctt. Für letztere ist der Name *D. radiella* (Goeze, 1783) verfügbar, während *D. heraclei* (Retzius, 1783) nicht verfügbar ist. Ein Lectotypus wird für *Pyralis applana* Fabricius, 1777 festgelegt. *Phalaena radiella* Goeze, 1783 wird als Typusart von *Depressaria* Haworth, 1811 festgelegt.

Key words. Biological control, nomenclature of Microlepidoptera, Depressariidae, *Agonopterix*, *Heracleum mantegazzianum*, Caucasus.

Introduction

Over the last century classical biological control, the use of living organisms to control pest populations, has become an increasing practice for controlling invasive weeds (Fowler & Holden 1994; Wittenberg & Cock 2001). It is hypothesized that weeds become invasive partly because they are introduced without their natural enemies (Blossey & Nötzold 1995; Keane & Crawley 2002). Released from the regulatory effect of plant diseases and insect herbivory, the plants establish themselves and proliferate rapidly in the introduced region. The strategy of classical weed biocontrol is therefore to search the native area of the plant for suitable natural enemies and introduce the biological control agents into the invaded regions.

Giant hogweed, *Heracleum mantegazzianum* Sommier & Lévier (Apiaceae), is an invasive weed in Europe and has spread rapidly during the last decades. The plant is native to the Caucasus, South-West Asia, where it occurs in forest edges and meadows,



Figs. 1–6. Adults of *Agonopterix* species. **1–2.** *A. caucasiella* sp. n. ♀, Paratypes from Russia, Caucasus, Karachay-Cherkessie Rep., Zelenchukskaya environment. **3–5.** *A. heracliana* (Linnaeus). **3, 5.** ♂, Denmark. **4.** ♀, Poland. **6.** *A. ciliella* (Stainton). ♂, Denmark.

or at stream sides in montane areas (Mandenova 1950; Tiley et al. 1996). Strikingly impressive in size and height, *H. mantegazzianum* was brought to European botanical gardens as an ornamental in the late 19th century (Pysek 1994). Due to high competitive ability and abundant seed production the plant has established in many countries of Europe, especially in Central Europe, where typical habitats are river banks, damp places and waste ground.

Once established, *H. mantegazzianum* can become the dominant vegetation forming monospecific stands which may reduce biodiversity and degrade habitat quality. Another main reason for controlling the plant is the health hazard to humans. The reaction of human skin to contact with plant sap and subsequent sun exposure causes

severe blistering followed by postinflammatory hyperpigmentation (Lundström 1984; Pathak 1986). The need for sustainable solutions to stop further spread and prevent future invasions led to the initiation of the "Giant Alien" Project. This collaborative multidisciplinary project was a part of the EU 5th Framework Program with the overall objective to develop an integrated management strategy that comprises effective, practicable and sustainable means of controlling giant hogweed. Biological control may act as a component of an integrated approach to prevent the spread of the plant, and during 2002 and 2003 herbivorous insect species and fungal plant pathogens associated with *H. mantegazzianum* were sought in the area of origin in the north-western Caucasus (Seier et al. 2003; Hansen et al. 2006).

In 2003, larvae and pupae of an undescribed species of the genus *Agonopterix* Hübner, 1825 (Depressariidae) were found in the flowering umbels of *H. mantegazzianum* at a single location in the Russian Caucasus. In the following year the search for this species was intensified and several stands of *H. mantegazzianum* were investigated in the area of the first discovery. Based on observations and collections during field expeditions in 2003 and 2004 the aim of this paper is to describe the biology, morphology, systematics and nomenclature of the new species, compared with its closest relatives.

Materials and methods

Two field surveys of phytophagous insects associated with *H. mantegazzianum* were undertaken in the north-western Caucasus from 8–15 August 2003 and 23–30 July 2004. Six different populations located in the Karachay-Cherkessia Republic, Russian Federation were visited. Grid references and altitude of the locations surveyed in 2004 are listed below in Tab. 1.

The habitats included river banks, abandoned fields, mountain slopes and forest clearings and the populations each comprised at least one hundred adult individuals in a flowering or reproductive stage. In forest clearings and mountain slopes at higher altitudes (Fig. 15) the giant hogweed plants were scattered in a tall herb community, while the plants formed more dense stands in habitats such as abandoned fields (Fig. 13).

Collecting was mainly focused on the search for larvae in the flower buds and the umbels but also leaf sheaths were examined for pupae. Other plant parts such as leaves and stems were only briefly investigated. Adult moths were not observed during the surveys and no attempts were made to collect adults by light or bait trapping. Three of the six localities were also visited on a second occasion where all flower buds and umbels of randomly selected plants were registered and thoroughly examined for larvae. Umbel diameter, position, and phenology (early flower, mature flower, late flower, early seed, mature seed) were recorded and the length of larvae collected was measured. At each locality between 14 and 22 plants were examined.

The larvae and pupae were collected in plastic containers, adding fresh food when necessary. After rearing the immature stages to adult emergence in climatic chambers at room temperature the moths were identified. No larvae or pupae of other species of Lepidoptera were found during examination of the *Heracleum* plants in the Caucasus.

Abbreviations

BMNH	The Natural History Museum, London, UK
ICZN	International Commission for Zoological Nomenclature
ZIN	Zoological Institute, Academy of Sciences, St. Petersburg, Russia
ZMUC	Zoological Museum, University of Copenhagen, Denmark
‡	Unavailable name

RESULTS

Agonopterix caucasiella sp. n.

Material. Holotype: ♂, "**Russia**, Caucasus | 44°09'N, 40°04'E | Majkop, 1300 m | Lago Naki 1 | pup. 12.viii.2003 | *Heracleum mantegazzianum* | leg. C. Nielsen" "Gen. præparat No 4374♂ Agonopterix sp. H. Hendriksen." (ZIN). Paratypes (all "Russia, Caucasus, *Heracleum mantegazzianum*, leg. C. Nielsen" – for longitude/latitude of specimens from 2004 see table 1): 1♀, 44°07'N, 40°02'E, Adigeya Rep., Majkop, Lago Naki 3, 1514 m, pup. 12.viii.2003; 3♂, 43°39'N, 41°24'E; Karachay-Cherkessie Rep., Arhyz, Karacevesk, 1762 m, la. 9.viii.2003; 1♂, 2♀, Karachay-Cherkessie Rep., 8 km S Storozhevaya, 1020 m, la[rva] 24.vii.2004; 8♂, 6♀, Karachay-Cherkessie Rep., 6 km W Pregradnaya, 960 m, la[rva].25.vii.2004; 8♂, 10♀, Karachay-Cherkessie Rep., 7 km SEE Pregradnaya, 950 m, la.25.–28.vii.2004; 7♂, 6♀, Karachay-Cherkessie Rep., Zelenchukskaya env., 920 m, la. 25.–29.vii.2004; 3♂, 2♀, Karachay-Cherkessie Rep., Zelenchukskaya region, 6 km SSW Nizhnij Arkhyz, 1760 m, la. 27.vii.2004; 3♀, Karachay-Cherkessie Rep., Zelenchukskaya region, 6 km SW Nizhnij Arkhyz, 1350 m, la. 27.–28.vii.2004 (paratypes in coll. ZIN, ZMUC and C. Nielsen).

Diagnosis. The new species (Figs. 1–2) is externally very close to *A. ciliella* (Stainton, 1849) (Fig. 6) and *A. heracliana* (Linnaeus, 1758) (Figs. 3–5), differing from them in the forewing which has two distinct white spots in the middle of the cell (*A. ciliella* and *A. heracliana* have two black dots here, with only a little white admixture), and a transverse patch of lighter reddish brown between discal dot and termen. The main difference is in the structure of the male genitalia, especially in the shape of the cuiller. The new species is characterized by the noticeably curved cuiller with an oppositely curved apex (Fig. 7). *A. ciliella* and *A. heracliana* have slightly curved cuiller with the apex turned in the same direction (Figs. 8, 9).

Description. Forewing length 9–11 mm, wingspan 20–24 mm. Head yellowish white mottled with grey, frons white. Antenna grey with black transverse bars on upper surface; upperside of scape black, underside white. Second segment of labial palpus white with black scales, sometimes mottled with pink scales; apical segment white with pink shade and two black rings near base and near apex. Thorax covered with black, brown and white scales. Forewing rather dark reddish brown mixed with black scales, near the base some white scales; along the costal margin black scales alternating with pink scales; discal dot white; in the middle of the cell two white dots, the lower one being especially large and conspicuous; between these two dots and the discal dot is an additional small white dot, which is sometimes absent; fringe brownish grey; between discal dot and termen is a transverse patch of lighter reddish brown. Hindwing grey with grey fringe and darker veins. Underside of forewing dark grey with a row of pale dots along the costal and outer margins. Female similar to male.

The specimens of the type series exhibit only minor variation. Worn specimens tend to be lighter than freshly emerged ones.

Male genitalia (Figs. 7, 7a). Gnathos elongated, spindle-shaped and spinuliferous. Transtilla of uniform width. Valva narrowing to rounded apex. Cuiller (sclerotized process on the distal end of sacculus) noticeably curved towards apex of valva, with apex of cuiller curved towards the costal margin of the valva. Phallus rather short, more or less straight, with tiny cornuti.

Female genitalia (Figs. 10, 10a). Ovipositor short. Ostium close to anterior margin of sternum VIII. Apophyses anteriores two-thirds length of apophyses posteriores. Ductus bursae membranous, rather long; corpus bursae with very small, more or less oval signum.

The female genitalia are similar to those of *A. ciliella* (Figs. 11, 11a) and *A. heracliana* (Figs. 12, 12a). Small differences are found in the form of the margin of the ostium (not angular in *A. caucasiella*) and in size and form of signum. In *A. caucasiella* the signum is more or less oval, differing from the more rounded signum of *A. ciliella*. In *A. caucasiella* the signum is much smaller than in *A. heracliana*.

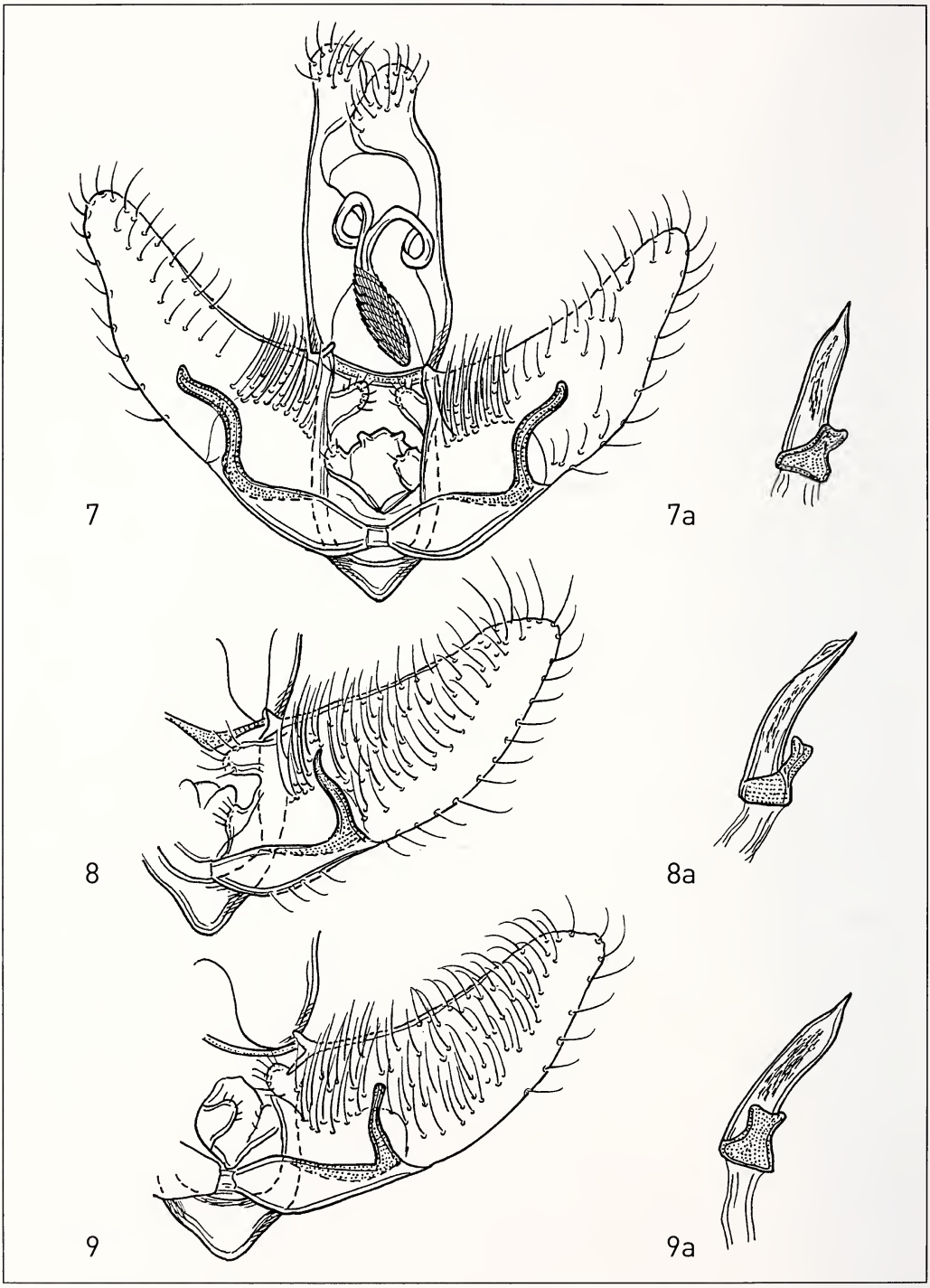
Distribution. Russia, North Caucasus: Krasnodarskiy krai and south of Stavropolskiy krai.

Life history. The length of the larvae found varied from 4 to 18 mm covering all but the very early larval instars. The larvae were rather easy to obtain by cutting down flowers and fruits of *H. mantegazzianum* in late July. Six localities were investigated in 2004 and immature stages of the moth were found at all study sites (Tab. 1). The larvae fed on buds, flowers and developing fruits within the umbels. In some cases a web was constructed around a portion of the partial umbel and the larva was feeding inside.

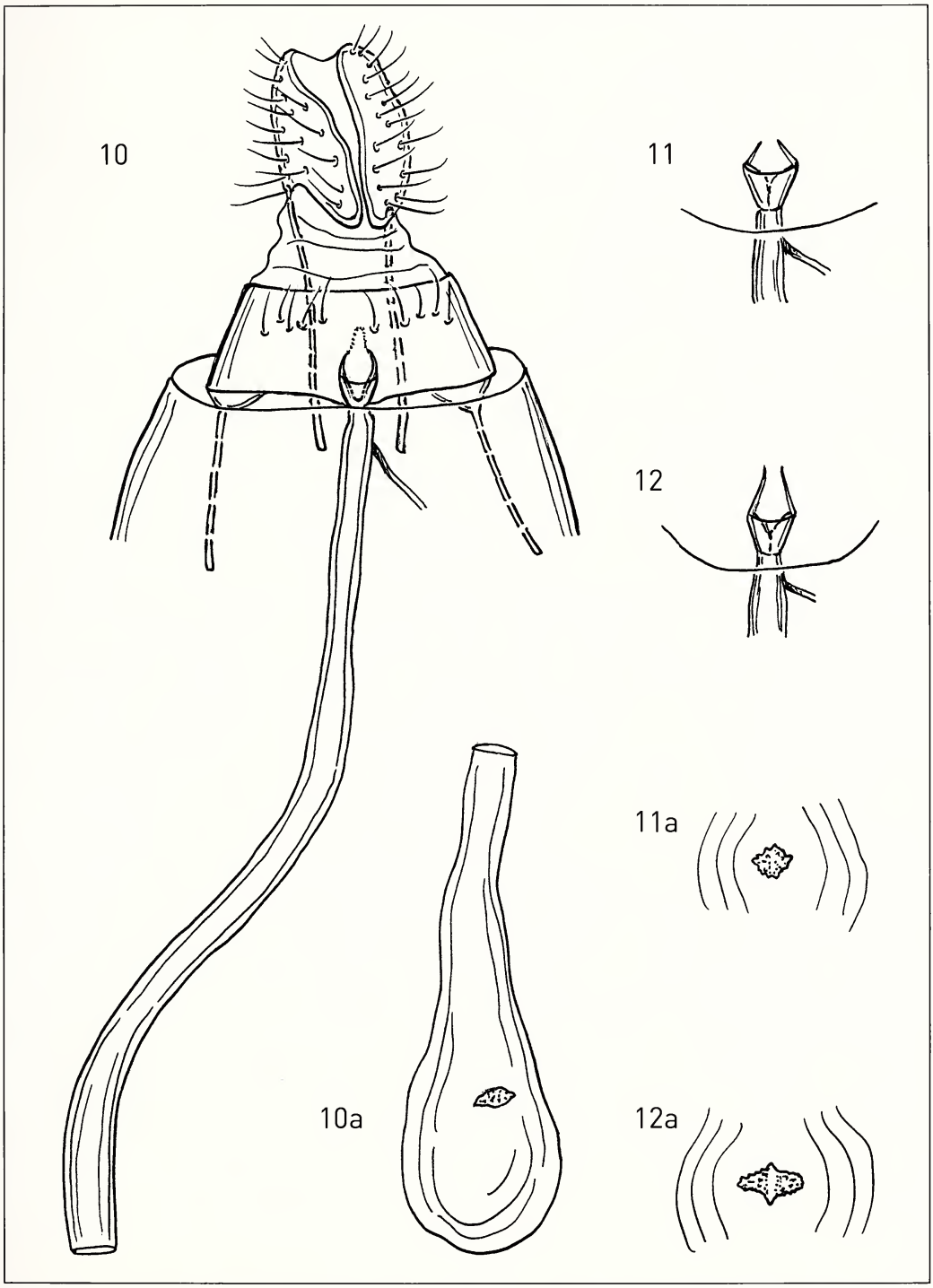
In the early larval instars the body was yellowish pale green, liberally speckled with small, but distinct blackish brown pinacula; prothoracic plate pale brown and head orange-brown. Later, as the larvae grew more than 10 mm long, the colour of the body became more green, with dorsal and subdorsal lines dark green and a pale brownish green head; thoracic and anal plates green. Near pupation the body turned reddish brown dorsally. A few pupae were located in the umbels or in the leaf sheaths. Pupation took place in late July or early August and this stage lasted about 2–4 weeks under laboratory conditions.

At the second visit to localities 3, 4, and 6 (Tab. 1) all flower buds and umbels of randomly selected plants were registered and carefully searched for larvae. In total, 724 umbels and 95 flower buds of 57 plants were examined and the collection of 47 larvae from 21 plants indicated a low density and rather clumped distribution of the larvae. The feeding larvae were found on umbels of diameters ranging from 5 to 58 cm, and larval attack was not related either to plant height or size of umbel (data not shown). However, synchrony between the development of the larvae and umbel phenology seemed evident as larval length increased with the maturation of the fruits in the umbels (Tab. 2). Host range of the larvae needs further testing before the potential of the moth as biocontrol agent against *H. mantegazzianum* is assessed.

Parasites. Two species of Hymenoptera parasites were reared from larvae of *A. caucasiella*: *Apanteles sicarius* Marshall, 1885 (Braconidae) (V. I. Tobias det.) and *Triclistus aethiops* (Gravenhorst, 1829) (Ichneumonidae) (V. I. Tolkanitz det.).



Figs. 7–9. Male genitalia. **7, 7a.** *A. caucasiella* sp. n. (7: Genitalia with phallus removed, Fig. 7a. Phallus). **Figs. 8, 8a.** *A. heracliana* (Linnaeus). **8.** Right valva, saccus, part of anellus and juxta. **8a.** Phallus. **Figs. 9, 9a.** *A. ciliella* (Stainton). **9.** Right valva, saccus, part of anellus and juxta. **9a.** Phallus.



Figs. 10–12. Female genitalia. **10, 10a.** *A. caucasiella* sp. n. (10: Proximal part of genitalia with ductus bursae; 10a: Corpus bursae with signum). **11, 11a.** *A. ciliella* (Stainton). **11.** Margin of sternum VIII with ostium, antrum and proximal part of ductus bursae. **11a.** Part of corpus bursae with signum. **Figs. 12, 12a.** *A. heracliana* (Linnaeus). **12.** Margin of sternum VIII with ostium, antrum and proximal part of ductus bursae. **12a.** Part of corpus bursae with signum.

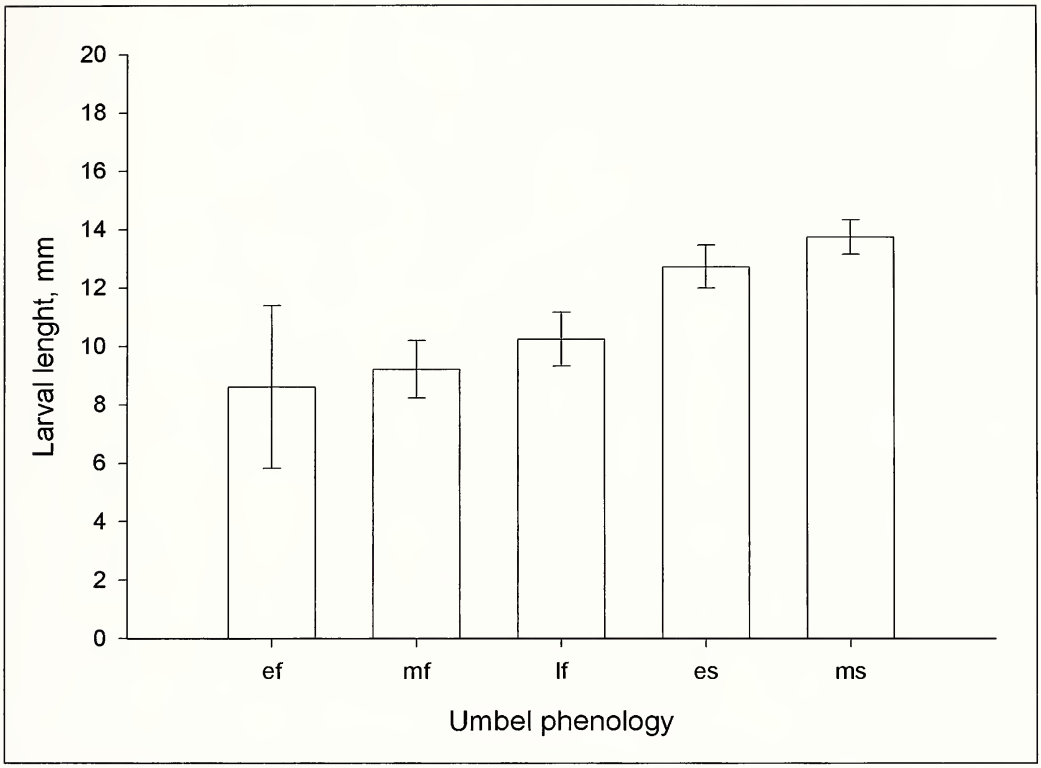
Tab. 1. Description of localities sampled in 2003 and 2004 in the Karachay-Cherkessia Republic, Russia and the number of collected larvae and emerged adults of *A. caucasiella*.

Locality no.	Administrative description	Grid reference	Altitude	Description of locality	Plant development stage	Date	No of collected larvae and pupae	No of emerged adults
1	8 km S Storozhevaya	N43°49'07.6" E41° 7'35.3"	1020 m	abandoned field	Late flowering, reproductive	24.vii.	4	3
2	6 km W Pregradnaya	N43°57'02.9" E41° 6'02.3"	960 m	road side / abandoned field	Late flowering	25.vii.	11	5
3	7 km SEE Pregradnaya	N43°54'45.7" E41° 7'02.8"	950 m	abandoned field	Late flowering, reproductive	25.– 28.vii.	24 19	13
4	Zelenchukskaya env.	N43°53'10.0" E41° 2'23.8"	920 m	abandoned field / river bank	Reproductive	25.– 29.vii.	27 7	15
5	6 km SSW Nizhnij Arkhyz, Zelenchukskaya region	N43°39'28.1" E41° 4'99.3"	1760 m	hill slope	Early flowering	(9.vii. 2003) 27.vii.	(3) 6	(3) 2
6	6 km SW Nizhnij Arkhyz, Zelenchukskaya region	N43°39'22.3" E41° 3'30.5"	1350 m	forest clearing / hill slope	Mature flowering, early reproductive	27.– 28.vii.	15 21	18

Remarks. *Agonopterix caucasiella* sp. n. is closely related to *A. ciliella* (Stainton) and *A. heracliana* (Linnaeus). The nomenclature of the latter is unusually complicated and confusing and we therefore find it appropriate, in connection with the description of a new species feeding on *Heracleum*, to discuss it in some detail. Another related species is the North American *A. clemensella* (Chambers, 1876), which also uses *H. mantegazzianum* as a host plant (Berenbaum 1982; Robinson et al. 2005), but it differs in details of the genitalia of both sexes (Clarke 1941).

***Agonopterix heracliana* (Linnaeus, 1758: 532) (*Phalaena* (*Tortrix*))**
[*Phalaena*] *punctata* Clerck, 1759: pl. 2, fig. 15.
‡*Phalaena* (*Tortrix*) *heracleana* Linnaeus, 1761: 347.
Pyralis applana Fabricius, 1777: 294.
‡*Phalaena cerefolii* Retzius, 1783: 45.
‡*Phalaena heraclei* Retzius, 1783: 45.
Tinea heraclella Fabricius, 1798: 484.
Tinea applanella Fabricius, 1798: 484.
Tinea cicutella Hübner, 1796: 39, pl. 12, fig. 79.
Depressaria heraclei Haworth, 1811: 505.
Depressaria heracliella Doubleday, 1859: 29.

Tab. 2. Average larva length (± S.E.) in relation to umbel phenology (ef = early flower, mf = mature flower, lf = late flower, es = early seeds, ms = mature seeds), n = 45. Two larvae found in the flower buds are not included in the figure.



Phalaena (*Tortrix*) *heracliana* was based on an unstated number of specimens. The type locality was (indirectly) given as Sweden (see also (Linnaeus, 1761)). It was stated that it occurred in umbels of *Heracleum*. In addition to his diagnosis of *heracliana* Linnaeus also gave references to figures in the works of De Geer (1752: pl. 29 figs. 6–7) and Réaumur (1736: pl. 16 figs. 1–4). Those by De Geer are of the species with larva feeding in rolled leaves of (e.g.) *Anthriscus sylvestris*, viz. *Agonopterix heracliana*, while those of Réaumur show a larva feeding in the umbels of a species of Apiaceae (*Depressaria radiella*). In Linnaeus' collection Robinson & Nielsen (1983: 215) found five specimens representing both of the above mentioned species.

Before them Bradley (1966) had studied the material in Linnaeus' collection, recognizing only two specimens, both belonging to the *Agonopterix* species, and designated one of them as the lectotype. By this action he fixed the name *heracliana* to the *Agonopterix* species. This was a most inappropriate action because the stability of nomenclature for the involved species became upset by: 1) the specific name *heracliana* was moved from being the valid name for one well known species (in *Depressaria*) to becoming the valid name of another well known species (in *Agonopterix*), 2) the long established name *applana* (Fabricus) was sunk as a synonym, 3) the long established name *heracliana*

(in the combination *Depressaria heracliana* (Linnaeus)) was replaced by a name, *D. pastinacella* (Duponchel), which turned out not to be the oldest name for the species, and 4) *Phalaena heracliana* (Linnaeus) is the type species of the genus *Depressaria* Haworth, 1811 (Nye & Fletcher 1991: 91), and the lectotype designation by Bradley (1966) resulted in a case with a genus having a misidentified type species. Under the previous code such a case should have been referred to the ICZN, but that did not happen.

There would probably have been a good case for asking the ICZN to preserve the name *Phalaena heracliana* (Linnaeus) for the *Depressaria* species. Now, nearly 40 years later, this possibility is probably lost, because the use of *heracliana* in *Agonopterix* has been broadly accepted, and a return to its former use within *Depressaria* would cause additional confusion.

Phalaena punctata was based on a figure published by Clerck (1759). According to Robinson & Nielsen (1983: 224) there is no material of *P. punctata* in Clerck´s collection, and it is likely that Clerck figured a specimen from Linnaeus´ collection.

Phalaena (*Tortrix*) *heracleana* is an incorrect subsequent spelling (misspelling) of *P.* (*T.*) *heracliana* Linnaeus, 1758 (Robinson & Nielsen 1983: 215).

Pyralis applana was described from an unspecified number of specimens collected by Sehested in Kiel, Germany (Fabricius 1777). In Fabricius´ collection in ZMUC are three specimens, all in rather poor condition, but clearly referable to *applana*, one of them labelled "applana" in Fabricius´ handwriting. In the Sehested & Tønder Lund collection in ZMUC is a male, unset but in good condition. Seen in the light of the nomenclatorial confusion around the name *applana* it seems justifiable to designate the last mentioned male as the lectotype. It is labelled: "Mus. Seh. & T. L. | T. applanella | Lectotype, Pyralis applana Fabricius, 1775, O. Karsholt design., 2005". The three specimens in Fabricius´ collection are labelled as paralectotypes.

Retzius diagnosed and named insects described by De Geer (1752) without using the Principle of Binominal Nomenclature (ICZN 1999, article 5). However, the work by Retzius (1783) was not consistent in application of binominal nomenclature, and therefore it does not meet the demands of the Code (ICZN, 1999: article 11.4) and the names published therein are invalid under the Code. We are aware that names proposed by Retzius (1783) are used as valid for several species of Lepidoptera, and also for species of other insect groups, but a discussion of this problem falls outside the present study.

Retzius was aware that Linneaus (1758) had mixed two species under *Ph. heracliana*, viz. the one figured by Réaumur (1736) and the one figured by De Geer (1752). For the latter which, as stated above, is the *Agonopterix* species, he proposed the name *Ph. cerefolii*.

The other species (the one figured by Réaumur) is, according to Retzius (1783) and in agreement with most later authors, the real *Ph.* (*T.*) *heracliana* (Linnaeus), which was later placed in the genus *Depressaria*. Linnaeus had placed this species in his "subgenus" *Tortrix* and had, accordingly given it a name ending in *–ana*. Retzius did not use *Tortrix*, but placed most moths in the genus *Phalaena*, and emended its

name to *heraclei*. Although being an emendation under the present Code, it should be noted that at the time of Retzius a change of termination of species-group names was customary when changing the generic combination used. Being an emendation of *Ph.* (*T.*) *heracliana* Linnaeus the type of *Ph. heraclei* Retzius is the same as that of *Ph.* (*T.*) *heracliana*. Due to the unfortunate lectotype designation of *Ph.* (*T.*) *heracliana* Linnaeus by Bradley (1966) (see above) *Ph. heraclei* moreover becomes a misidentification, since Retzius described the *Depressaria* species, but used his emended name of *heracliana*, which since 1966 belongs to the *Agonopterix*. Besides being both an emendation and a misidentification (of *Ph.* (*T.*) *heracliana* Linnaeus) *Ph. heraclei* is moreover invalid under the Code.

Tinea heraclella is both a misidentification and an unjustified emendation of *Phalaena* (*Tortrix*) *heracliana* Linnaeus, Fabricius (1798) clearly referred to *Phalaena heracleana* [sic!] Linnaeus, but none of the three specimens in his collection are conspecific with the lectoptype of *Ph.* (*T.*) *heracliana* Linnaeus designated by Bradley (1966). However, being an emendation, the type of *T. heraclella* is the same as that of *Ph.* (*T.*) *heracliana*, which belongs to the *Agonopterix* species. As discussed above, at the time of Fabricius the change of termination in a species name had to follow the change in generic combination.

Tinea applanella is an emendation, which was made by Fabricius (1798) when transferring *applana* from the genus *Pyralis* to the genus *Tinea*.

Tinea cicutella was described from an unstated number of specimens from Augsburg in Germany ["Sie ist hier ...anzutreffen" (Hübner, 1796: 39)].

Depressaria heraclei Haworth is an emendation of *Phalaena* (*Tortrix*) *heracliana* Linnaeus, thus being an objective synonym of the latter. It is also a misidentification, as Haworth under the name of *D. heraclei* described *Depressaria radiella* (Goeze), and it is a homonym of *Ph. heraclei* Retzius.

Depressaria heracliella Doubleday is an unjustified emendation of *Phalaena* (*Tortrix*) *heracliana* Linnaeus (cited as 'heracliana, 'De Geer", and it is, after the lectotype designation by Bradley (1966) a misidentification of *Depressaria radiella* (Goeze).

It adds to the confusion of the involved species that *Heracleum* is not a main host plant for *A. heracliana* (Zeller, 1854: 203).

***Depressaria radiella* (Goeze, 1783: 162) (*Phalaena* (*Tinea*))**
Tinea radiata Geoffroy *in* Fourcroy: 1785: 320.
Haemilis pastinacella Duponchel, 1838: 153, pl. 291 figs. 4–5.
Depressaria sphondiliella Bruand d'Uzelle, 1851: 73.
Depressaria ontariella Bethune, 1870: 3.
Depressaria caucasica Christoph, 1877: 293.
Depressaria heracliana auct.; misidentification.
‡*Depressaria heraclei* (Retzius); misidentification.

This species was for more than 200 years known as *Depressaria heracliana* (Linnaeus). Due to the lectotype designation of *Ph.* (T.) *heracliana* Linnaeus by Bradley (1966) it had to change name, and Bradley suggested the oldest synonym known to him, *Haemilis pastinacella* Duponchel. Over the next decades this name came slowly into use.

Fig. 13. *Heracleum mantegazzianum* in the native area of western Caucasus. The stand is located in an abandoned field (locality 1), altitude: ca. 1020 m.

However, in the second edition of the French checklist, Leraut (1997) listed three older synonyms (two of which are accepted here). In a comment Leraut (1997: 314) stated that he considered *Depressaria heraclei* (Retzius) as the oldest name for this species, referring to "Leraut, *in prep.*". Now eight years later no details of this synonymy has been published and, as discussed above, *Ph. heraclei* Retzius is an emendation of *Ph.* (T.) *heracliana* Linnaeus, and therefore an objective synonym.

Goeze (1783) named a number of taxa, which had been described by Geoffroy (1762) without using the Principle of Binominal Nomenclature (ICZN 1999, article 5). *Phalaena* (*Tinea*) *radiella* is one of them. The type locality is the area of Paris.

The works of Goeze and Retzius were both published in 1783. We have no information on more exact dates for their publication but we suggest, seen in the light of the doubtfulness on the validity of the names proposed in Retzius´ work, that whenever it becomes relevant the work of Goeze should pre-date that of Retzius.

Also Fourcroy (1785) gave Latin names to taxa described by Geoffroy. However, for the species already named by Goeze (1783) the names of Fourcroy, as in this case, became objective synonyms. There has been a great deal of confusion as to whether Fourcroy or Geoffroy should be cited as the author of these names, but a discussion of this falls outside the present study.

Fig. 14. A population of *H. mantegazzianum* growing on a hill slope (locality 5), altitude 1760 m. In western Caucausus stands of *H. mantegazzianum* were found in altitudes up to approximately 2000 m.

Haemilis pastinacella was described from an unstated number of specimens from Austria, Bohemia and France. According to Zeller (1854) they included at least two different species. A lectotype was published by Bradley (1966: 226).
Depressaria sphondiliella Bruand d'Uzelle is an unneccessary replacement name for *Depressaria pastinacella* (Duponchel).
Depressaria caucasica was described from an unstated number of specimens (2 males and 1 female are deposited in the BMNH) collected by Christoph in southern Daghestan in Caucasus. It is considered as a highland form of *D. pastinacella* (Duponchel) (Lvovsky 1998).
Depressaria ontariella was described from an unstated number of specimens bred from parsnip (*Pastinaca*) in Ontario, Canada.
As discussed above, the lectotype of *Ph.* (*T.*) *heracliana* belongs to the *Agonopterix* species (Bradley 1966), and all uses of the name *heracliana*, and its emendations *heraclei*, *heraclella* and *heracliella* for the *Depressaria* species thereby become misidentifications. Further variations in spelling of the species-group name *heracliana* are found in the literature, but all are misspellings and thus invalid.
As mentioned above *Phalaena* (*Tortrix*) *heracliana* is the type species of the genus *Depressaria* (Nye & Fletcher 1991: 91), and the lectotype designation by Bradley

(1966) resulted in a case of a misidentified type species of this genus. Under previous editions of the Code such cases of misidentification had to be referred to the ICZN, but that was not done. Under the present code (ICZN 1999, article 70.3) it is left to authors who discover cases of misidentification to correct these in the way that best serves stability. We accordingly select, and thereby fix as type species for the genus *Depressaria* Haworth, 1811, *Phalaena radiella* Goeze, 1783 (= *Phalaena* (*Tortrix*) *heracliana* auct., nec Linnaeus, 1758).

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