Nepticulidae from the Volga and Ural region

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Abstract. The Nepticulidae of the Russian provinces (oblasts) Ul'yanovsk, Samara, Saratov, Volgograd, Astrakhan and Chelyabinsk and the Kalmyk Republic are listed. We record 60 species, including two only previously recorded, 28 species only on the basis of leafmines (indicated with an *). Seventeen species are recorded as new for Russia. Eleven of these are reported on the basis of adults: *Stigmella glutinosae* (Stainton, 1858), *S. ulmiphaga* (Preissecker, 1942), *S. thuringiaca* (Petry, 1904), *S. rolandi* Van Nieukerken, 1990, *S. hybnerella* (Hübner, 1813), *Trifurcula* (*Trifurcula*) *subnitidella* (Duponchel, 1843), *T.* (*T.*) *silviae* Van Nieukerken, 1990, *T.* (*T.*) *beirnei* Puplesis, 1984, *T.* (*T.*) *chamaecytisi* Z. & A. Laštůvka, 1994, *Ectoedemia* (*Zimmermannia*) *liebwerdella* Zimmermann, 1940 and *Ectoedemia* (*Ectoedemia*) *caradjai* (Groschke, 1944). Six species are reported on the basis of mines only: *Stigmella freyella* (Heyden, 1858), *S. nivenburgensis* (Preissecker, 1942), *S. paradoxa* (Frey, 1858), *S. perpygmaeella* (Doubleday, 1859), *Ectoedemia* (*Ectoedemia*) *atricollis* (Stainton, 1857) and *E. spinosella* (Joannis, 1908). *Astigmella dissona* Puplesis, 1984 is synonymised with *Stigmella naturnella* (Klimesch, 1936), here recorded for European Russia for the first time, bridging the gap between Far East Russia and Europe. *S. juryi* Puplesis, 1991 is synonymised with *S. paradoxa* (Frey, 1858). *S. zelleriella* (Snellen, 1875) is found in a stream valley in steppe area, probably associated with *Salix triandra*, a different host in habitat that differs widely from other occurrences. *S. obliquella* (Heinemann, 1862) is for the first time recorded from European Russia. A few new records outside this area are cited under distribution, including *Ectoedemia* (*Fomoria*) *weaveri* (Stainton, 1855) recorded from Magadan in the Far East.

Zusammenfassung. Es wird ein Verzeichnis der Nepticulidae der Russischen Provinzen (Oblasten) Uljanowsk, Samara, Saratow, Wolgograd, Astrachan und Tscheljabinsk sowie aus der Kalmykkischen Republik gegeben. Insgesamt sind 60 Arten (inklusive zwei in früherer Zeit angegebene) enthalten, wovon 28 nur durch Blattminen belegt sind (in der Zusammenstellung mit dem Symbol * markiert). Siebzehn Arten sind neu für Russland, davon wurden elf als Imagines gefunden: *Stigmella glutinosae* (Stainton, 1858), *S. ulmiphaga* (Preissecker, 1942), *S. thuringiaca* (Petry, 1904), *S. rolandi* Van Nieukerken, 1990, *S. hybnerella* (Hübner, 1813), *Trifurcula* (*Trifurcula*) *subnitidella* (Duponchel, 1843), *T.* (*T.*) *silviae* Van Nieukerken, 1990, *T.* (*T.*) *beirnei* Puplesis, 1984, *T.* (*T.*) *chamaecytisi* Z. & A. Laštůvka, 1994, *Ectoedemia* (*Zimmermannia*) *liebwerdella* Zimmermann, 1940 und *Ectoedemia* (*Ectoedemia*) *caradjai* (Groschke, 1944). Von sechs Arten wurden nur Blattminen gefunden: *Stigmella freyella* (Heyden, 1858), *S. nivenburgensis* (Preissecker, 1942), *S. paradoxa* (Frey, 1858), *S. perpygmaeella* (Doubleday, 1859), *Ectoedemia* (*Ectoedemia*) *atricollis* (Stainton, 1857) und *E. spinosella* (Joannis, 1908). *Astigmella dissona* Puplesis, 1984 wird synonymisiert mit *Stigmella naturnella* (Klimesch, 1936). Diese Art wird hier zum ersten Mal aus dem europäischen Teil Russlands gemeldet, wodurch die große Verbreitungslücke zwischen Mitteleuropa und dem Fernen Osten geschlossen wird. *S. juryi* Puplesis, 1991 wird synonymisiert mit *S. paradoxa* (Frey, 1858). *S. zelleriella* (Snellen, 1875) wurde in einem Bachtal im Steppenbereich gefunden und ist dort wahrscheinlich trophisch mit *Salix triandra* assoziiert, lebt hier also im Vergleich zu den anderen bekannten Vorkommen an einer anderen Futterpflanze und in einem sehr verschiedenartigen Habitat. Auch *S. obliquella* (Heinemann, 1862) wird hier zum ersten Mal aus dem europäischen Teil Russlands gemeldet. Die Verbreitungsangaben enthalten auch einige Neumeldungen außerhalb dieses Gebietes, darunter *Ectoedemia* (*Fomoria*) *weaveri* (Stainton, 1855) aus Magadan im Fernen Osten.

Резюме. Приведен список молей-малюток Ульяновской, Самарской, Саратовской, Волгоградской, Астраханской, Челябинской областей и Республики Калмыкия. Из 60 отмеченных видов лишь 2 были приведены предшествующими исследованиями; 28 видов приведены на основании характерных листовых мин (отмечены в тексте статьи звездочкой *). 17 видов приведены как новые для фауны России, 11 из них отмечены на имагинальной фазе (*Stigmella glutinosae* (Stainton, 1858), *S. ulmiphaga* (Preissecker, 1942), *S. thuringiaca* (Petry, 1904), *S. rolandi* Van Nieukerken, 1990, *S. hybnerella* (Hübner, 1813), *Trifurcula* (*Trifurcula*) *subnitidella* (Duponchel, 1843), *T.* (*T.*) *silviae* Van Nieukerken, 1990, *T.* (*T.*) *beirnei* Puplesis, 1984, *T.* (*T.*) *chamaecytisi* Z. & A. Laštůvka, 1994, *Ectoedemia* (*Zimmermannia*) *liebwerdella* Zimmermann, 1940 и *Ectoedemia* (*Ectoedemia*) *caradjai* (Groschke, 1944)); 6 видов – только на основании мин: *Stigmella freyella*

(Heyden, 1858), *S. nivenburgensis* (Preissecker, 1942), *S. paradoxa* (Frey, 1858), *S. perpygmaeella* (Doubleday, 1859), *Ectoedemia* (*Ectoedemia*) *atricollis* (Stainton, 1857) и *E. spinosella* (Joannis, 1908). *Astigmella dissona* Puplesis, 1984 синонимизируется с *Stigmella naturnella* (Klimesch, 1936), впервые отмечаемой для Европейской России и закрывающей таким образом ранее существовавший пробел в распространении вида между Западной Европой и Дальним Востоком России. *S. juryi* Puplesis, 1991 синонимизируется с *S. paradoxa* (Frey, 1858). *S. zelleriella* (Snellen, 1875) обнаружена на берегу ручья в глинистой степи, где, вероятно, связана с *Salix triandra*, новым для нее кормовым растением в данном биотопе, резко отличном от известных. Также впервые для Европейской России приводится вид *S. obliquella* (Heinemann, 1862). Несколько новых находок за пределами изучаемого региона обсуждаются в данных по распространению: *Ectoedemia* (*Fomoria*) *weaveri* (Stainton, 1855) отмечается из-под Магадана.

Key words. Russia, faunistics, new records, new synonymy, *Stigmella*, *Ectoedemia*, *Bohemannia*, *Trifurcula*.

Ключевые слова. Россия, фаунистика, новые находки, новая синонимия, *Stigmella*, *Ectoedemia*, *Bohemannia*, *Trifurcula*.

Introduction

The leafmining moth family Nepticulidae is relatively poorly known from large parts of Russia. Previous research has concentrated on the fauna of the far eastern Primorskiy Kray, the former Soviet republics of Central Asia and the Crimea in Ukraine (Puplesis 1994). In his book Puplesis lists many species from the European part of Russia, but gives very few pertinent records. Also in the earlier faunal treatment of the larvae (Gerasimov 1952) no detailed records were given, and for many species the only indication of distribution is 'European part of the Soviet Union'. Such records could also have been referring to Ukraine, Byelorussia or the Baltic republics. Hence, the occurrence in Russia is often not clear.

There is a number of faunistic papers which deal with some species of Nepticulidae from a few provinces (regions) in the European part of Russia, the northwest being comparatively well investigated: Murmansk (Kozlov & Jalava 1994; Kozlov et al. 2000), Karelia (Kutenkova 1986, 1989) and a checklist for Leningrad (Jürivete et al. 2000). In the west, Nepticulidae are recorded from Smolensk, Bryansk (Skala 1944) and Kaluga (Shmytova 2001, 2002). Other scattered records can be found in some ecological studies (Kozlov 1996; Kozlov & Koricheva 1990, 1991). A few mines have also been reported from the Caucasus and Black Sea Coast (Utech 1962).

For the lower and middle Volga region, there are very few published records for Nepticulidae. Surprisingly no species were listed by Eversmann (1844). Another well know 19th century lepidopterist working in this area, Hugo Christoph, did not publish any nepticulid record, but he collected a few specimens near Sarepta (Volgograd), which are now in the Natural History Museum in London; they have been studied by the senior author and are listed here. A few species were recorded from the upper Volga reaches in Tatarstan (Kazan district) (Krulikowsky 1908). Further Puplesis recorded *Stigmella kazakhstanica* Puplesis, 1991 from Astrakhan (Puplesis et al. 1991) (but see below under *S. ulmiphaga*), *Trifurcula* cf. *puplesisi* Van Nieukerken, 1990 was recorded from Sarepta (Krasnoarmeysk) (van Nieukerken 1990) and *T. pallidella* (Duponchel, 1843) from the Saratov region (Puplesis 1994). More recently, Sachkov et al. (1997) list several miners from the Zhiguli Nature reserve in the Samara region

and Anikin (2001) lists three species from the Volga region, including the already cited *T. pallidella* and *S. kazakhstanica*.
The junior authors and several colleagues extensively collected Lepidoptera in the Volga and Ural region, results of which have partly been published by Anikin et al. (1993). Adult Nepticulidae and many mines were collected in the Ul'yanovsk and Samara provinces, middle Volga, but a few adults have also been collected in Saratov, Volgograd and Astrakhan in the lower Volga valley and mines were also collected in the Kalmyk republic. We also include the record of just two specimens taken in the southern Ural (Cheliabinsk) during recent Russian-Finnish expeditions (Ahola et al. 1997; Nupponen et al. 2000).
During all these studies, 30 species of Nepticulidae were collected as adults and in addition the mines of 28 other identifiable species were found (plus mines of some species recorded as adults as well). With the previously recorded (uncertain) *S. kazakhstanica* and *T. puplesisi*, the total is 60 species of Nepticulidae. Although this is in all probability only a small portion of the actual fauna of the region (estimated to be at least 100 species), we publish these records here, since they provide interesting biogeographical data. At least 17 species are new for Russia, and for a few others these comprise the first published detailed records for Russia. For many species these records show an enormous eastward extension of the known distribution. The few records of species in the *Stigmella ruficapitella* group have also been given by van Nieukerken & Johansson (2003).

Material and methods

Adults were mainly collected at light, mostly using a small generator with different types of lamps, or by sweeping vegetation at dusk. Leafmines were picked in the field and dried immediately; all attempts to rear the larvae were unsuccessful.
All specimens were identified or checked by the senior author. The adults are in the collection of V. V. Zolotuhin, but duplicates are stored in the National Museum of Natural History Naturalis, Leiden (RMNH). The majority of dried leafmines is kept in RMNH, with a reference collection kept by V. V. Zolotuhin.
Genitalia preparations were made partly in glycerine, partly in Euparal, following conventional procedures. Photographs of genitalia and of leafmines were taken with a Zeiss AxioCam digital camera attached to a Zeiss Axioskop H (genitalia slides) or a Zeiss Stemi SV 11 under dark field illumination (leafmines), using Carl Zeiss AxioVision 3.0.6 software. All photographs of genitalia show specimens embedded in Euparal, prepared by the senior author, and are annotated with 'EvN' numbers.
The described distribution of Nepticulidae over European countries follows van Nieukerken (2004), unless otherwise stated. Plant names follow the Flora Europaea (Tutin et al. 1964–1993; Flora Europaea website 2004).

Identification of leafmines. Since leafmines are not the organism itself, but only a trace, some authors prefer not to use records which are based on leafmines only, partly stimulated by the presence of many misidentifications in literature. However, in many

cases leafmines show good diagnostic characters, certainly in combination with host-plant identity. By omitting such data, one would loose valuable information on the distribution of species. However, the presence on the basis of leafmines alone needs to be treated with caution: for several hostplants it is clear that the mines are not always different enough to allow safe identification. This is especially the case with *Stigmella* mines on *Quercus* (see van Nieukerken & Johansson 2003), on rosaceous herbs, *Rosa*, *Rubus* and *Pyrus*. Also some mines on *Ulmus* can be problematic. We have not attempted to name such mines with any certainty, but list them at the end of the paper. Even for some of the named mines, we would prefer confirmation by reared adults. Species which we only record on the basis of leafmines, are marked with an asterisk (*) before the name.

Collection localities. Under each species we list the records alphabetically by province and a short locality name. The full details of the localities are given here, the bold printed locality name is used as short name throughout the paper. The localities are shown in the map (fig. 1). For the transliteration of the Cyrillic we follow the BSI system, the same as used by Times (2000). We give the province (oblast) and district (rayon) names in English as noun (e.g. 'Ul'yanovsk'), not in the Russian adjectival form (e.g. 'Ul'yanovskaya Oblast'), but we provide below Cyrillic names in the adjectival forms for all localities. For the collector names we use abbreviations, see below.

Astrakhan: [Астраханская область]

1. Akhtubinsk distr., 10 km NNE pgt N. Baskunchak, near lake Karasuk, 48°11'N, 46°54'E [Ахтубинск, Баскунчак, оз. Карасук]
2. Akhtubinsk distr., Bogdo Bolshaja, Surikovskaya b., 47°59'N, 46°48'E [Ахтубинск, Богдо, Суриковская б.]

Chelyabinsk: [Челябинская область]

3. S. Ural: Arkaim reserve, near Amurskiy village, 52°39'N, 59°34'E [Заповедник Аркаим, пос. Амурский] (see Nupponen et al. 2000)

Kalmyk Republic: [Республика Калмыкия]

4. Elista City Park, 46°19'N, 44°16'E [Элиста, городской парк]
5. Yashalta, 20 km SW, 160 km W Elista, oak forests, 46°20'N, 42°18'E [Яшалта]

Samara: [Самарская область]

6. Samarskaya Luka area, Zhiguli State Nature Reserve, Bakhilova Polyana, 53°24'N, 49°40'E [Жигулевский заповедник, Бахилова Поляна]
7. Samarskaya Luka area, Zhiguli State Nature Reserve, mixed forest on rocky slope, 53°25'N, 49°40'E [Жигулевский заповедник]

Saratov: [Саратовская област]

8. Saratov city, 51°34'N, 45°59'E [Саратов]

Ul'yanovsk: [Ульяновская область]

9. Aksakovo, Mayna distr., 60 km SWS Ul'yanovsk, 54°09'N, 47°31'E [с. Аксаково, Майнский район]
10. Akulovka, Nikolaevka distr., 150 km SWS Ul'yanovsk, limestone steppe, 53°06'N, 47°29'E [Акуловка, Николаевский р-н]
11. Arskoe outskirts, Ul'yanovsk distr., 15 km W of Ul'yanovsk, meadow near mixed forest, 54°16'N, 48°08'E [с. Арское, Ульяновский р-н]
12. Baryshskaya Sloboda, Surskoe distr., 85 km WNW Ul'yanovsk, 54°34'N, 46°48'E [Барышская Слобода, Сурский р-н]
13. Beketovka, Veshkayma distr., 100 km W Ul'yanovsk, Steppe, 54°06'N, 46°52'E [Бекетовка, Вешкаймский р-н]
14. Glotovka, Inza distr., 120 km W from Ul'yanovsk, humid mixed forest, 53°57'N, 46°43'E [Глотовка, Инзенский р-н]
15. Kalinovka, Radishchevo distr., ca. 150 km S of Ul'yanovsk, orchards, 52°58'N, 48°19'E [Калиновка, Радищевский р-н]
16. Karamzina outskirts, Ul'yanovsk distr., 10 km SWS Ul'yanovsk, mixed forest near by water, 54°14'N, 48°22'E [пос. Карамзина, Ульяновский р-н]
17. Kryazh (=Kryachok), Barysh distr., 53°47'N, 47°25'E [оз. Кряж, Барышский р-н]
18. Mar'evka, Novospasskoe distr., 120 km S Ul'yanovsk, grass steppe, 53°08'N, 48°09'E [с. Марьевка, Новоспасский р-н]
19. Ryabina railway station, Povolzhye, Radishchevo distr., 160 km S Ul'yanovsk, orchards and oak forest edge 52°53'N, 48°15'E [ж/д ст. Рябина, Радищевский р-н]
20. Shikovka, Povolzhye, Pavlovka distr., 200 km S Ul'yanovsk, 52°44'N, 47°27'E [с. Шиковка, Павловский р-н]
21. Srednikovo, Radishchevo distr., 140 km S Ul'yanovsk, steppe, 52°56'N, 48°06'E [Средниково, Радищевский р-н]
22. Staraya Mayna, Staraya Mayna distr., 10 km NE, 54°37'N, 49°05'E [р.п. Старая Майна, Старомайнский р-н]
23. Surulovka, Novospasskoe distr., steppe, 53°06'N, 47°46'E [Суруловка, Новоспасский р-н]
24. Tsemzavod outskirts, Sengiley distr., 20 km S Ul'yanovsk, mixed forest 54°02'N, 48°21'E [пос. Цемзавод, Сенгилеевский р-н]
25. Ul'yanovsk North, park Pobedy, 54°22'N, 48°25'E [Ульяновск, парк Победы]
26. Ul'yanovsk city, valley of Sviyaga river 54°18'N, 48°20'E [Ульяновск, пойма р. Свияги]
27. Ul'yanovsk, Vinnovka city park, 54°16'N, 48°20'E [Ульяновск, парк Винновская роща]
28. Tushna, Sengiley distr., ca 40 km S of Ul'yanovsk, mixed forest, 53°50'N, 48°22'E [р.п. Тушна Сенгилеевского р-на]
29. Vasil'evka, Novospasskoe distr., 130 km S Ul'yanovsk, 53°05'N, 48°07'E [Васильевка, Новоспасский р-н]

30. Vjazovka, Radishchevo distr., 160 km S Ul'yanovsk, 52°53'N, 48°26'E [Вязовка, Радищевский р-н]
31. Vjazovka, 6 km S, Radishchevo distr., 166 km S Ul'yanovsk, 52°51'N, 48°21'E [6 км Ю с. Вязовка, Радищевский р-н]
32. Yulovo, Inza distr., mixed forest, 53°58'N, 46°32'E [Юлово, Инзенский р-н]

Volgograd: [Волгоградская область]

33. Chapurnikovskaya balka, Krasnoarmeysk (= Sarepta) distr., 48°29'N, 44°30'E [Чапурниковская балка, Красноармейский р-н]
34. Krasnoarmeysk (= Sarepta), 48°31'N, 44°29'E [Красноармейск]
35. Tumak outskirts, Sredneakhtub distr., 48°39'N, 44°41'E [Тумак, Сред. Ахтуба]

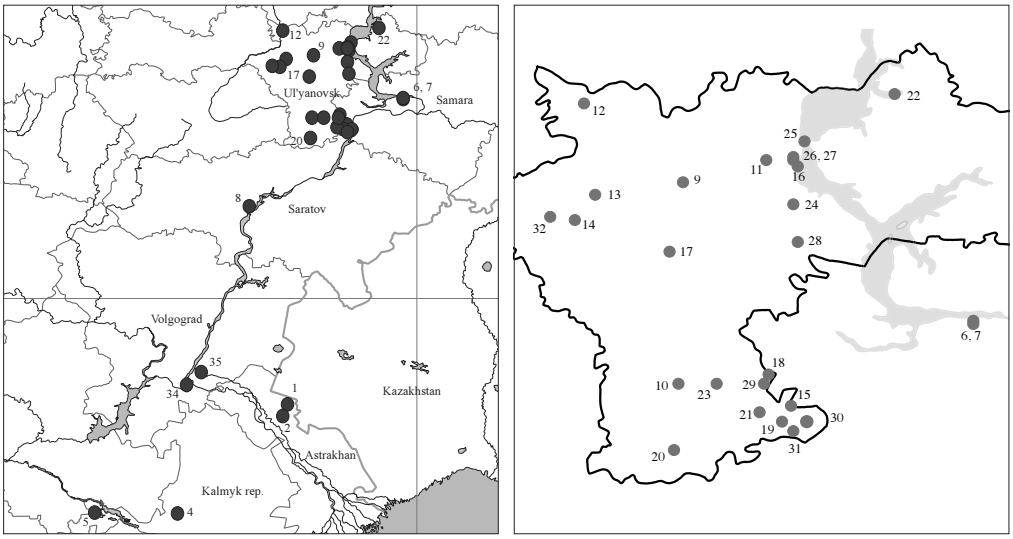


Fig. 1. Maps of the Volga region, showing the collection localities, see text for numbers; **Fig. 1.a.** Ul'yanovsk province.

Collectors. AV: V.V. Anikin. IA: A.Ju. Isajev. IV: V.B. Isajeva. JJ: J. Junnilainen. KD: D.A. Komarov. KA: A. Kovalev. MA: A.V. Mistchenko. NS: S.V. Nedoshivina. NK: K. Nupponen. RS: S.M. Rybakov. SS: S.A. Sachkov. SU: students of the Ul'yanovsk State pedagogical university. ZV: V.V. Zolotuhin.

Description of the region. The region is large and extends from the fringes of the Taiga in the north (ca. 54°20'N) to an extensive steppe zone in the southern parts (ca. 46°20'N). A more detailed description was given by Anikin et al. (1993). We describe a few localities were Nepticulidae were collected in more detail.

Parks in Ul'yanovsk City

Vinnovka forest-park and park Pobedy. – These are two very large forest-parks, which form recreation zones within the city. The Pobedy Park (fig. 2) consists of mixed forest remnants, with a dominance of *Betula pendula*, *Acer platanoides*, *Quercus*

Figs. 2–5. Some habitats where Nepticulidae were collected. **2.** Pobedy Park, Ul'yanovsk, in early spring, with flowering *Anemone*. **3.** Vinnovka park, Ul'yanovsk, with stream. **4.** Srednikovo, showing the grassy slopes and *Quercus robur* in foreground. **5.** Vjazovka: valley forest in background, steppe on foregound.

robur, *Populus tremula*, *Tilia cordata* and *Pinus sylvestris*. Smaller trees and shrubs are represented by *Sorbus aucuparia*, *Rhamnus cathartica*, *Euonymus verrucosus*, *Rosa* spp. and in open places the small shrubs *Chamaecytisus ruthenicus* and *Genista tinctoria*. The Vinnovka Park (fig. 3) is the remnant of a 19th century recreation area with orchards and forest. This park is situated in a deep ravine on the right banks of the Volga, with small sandy hills and numerous brooks. This condition results in an unusual mixture of xerophytic and hydrophytic plants. Most of the studied mines were collected in this park. The dominant trees are *Quercus robur*, *Alnus glutinosa*, *Acer platanoides*, *Tilia cordata*, *Corylus avellana*, *Ulmus* spp. and *Prunus spinosa*. Closer to the water grow different *Salix* spp., mainly *S. alba*, *S. triandra* and *S. caprea*. The open slopes in this park are completely covered with *Fragaria moschata, F. vesca* and other herbaceous Rosaceae. A rich fauna of Nepticulidae was found here, mostly as mines: *Stigmella naturnella*, *S. tiliae, S. aceris, S. malella, S. catharticella, S. paradoxa, S. salicis, S. lemniscella, S. lonicerarum, Ectoedemia atricollis, E. arcuatella, E. albifasciella, E. subbimaculella, E. spinosella* and all the *Populus* miners.

Forest biotopes

Aksakovo. – A small humid, deciduous forest within 2 km from the village, with a dominance of *Betula pubescens*, *B. pendula*, *Alnus glutinosa*, *Populus tremula* and *Salix* spp. There has only once been collected here, at light on 9 May, before budding of the trees. The collected Nepticulidae are the early flying species *Stigmella lapponica, S. magdalenae* and *S. sorbi*.

Forest-steppe biotopes

Srednikovo (fig. 4). – Mixed forest (*Pinus sylvestris*, *Populus tremula*, *Quercus robur*, *Prunus spinosa*, *Prunus fruticosa*, *Prunus padus*, *Rhamnus cathartica*) on limestone hills with a great diversity of rare plants on the open grassy slopes (*Hedysarum grandiflorum*, many species of *Astragalus*, *Globularia*, *Gypsophyla*, *Centaurea ruthenica*, *C. sumensis*, *Paeonia tenuifolia*). Here we collected the species feeding on *Chamaecytisus*: *Trifurcula pallidella* and *T. chamaecytisi*, but also *Stigmella glutinosae*.

Surulovka. – Similar vegetation, but on sandy steppe with a dominance of *Chamaecytisus*, *Genista*, *Fragaria* on open places. The Nepticulidae collected here, however, live on oaks: *Ectoedemia liebwerdella, E. longicaudella* and *E. albifasciella*.

Zhiguli. – The Zhiguli State nature Reserve is a hilly area (up to 382 m) on an Peninsula in a Volga Bend close to Samara, with ancient rocks of Permian age. These consist of dolomites and limestone covered with forests and small pockets with steppe. The dominant trees are *Quercus robur*, *Tilia cordata*, *Betula pendula*, *Pinus sylvestris*, *Acer platanoides*, *Populus tremula* with some *Ulmus glabra* and other *Acer* spp. and in the under storey *Lonicera xylosteum*, *L. tatarica*, *Viburnum opulus*, *Sambucus nigra*, *Rosa* spp., *Crataegus ambigua* (= *volgensis*), *Corylus avellana*, *Euonymus verrucosus* and *Rubus* spp. The shrubs *Caragana frutex* and *Spiraea crenata* are typical for the limestone steppes and *Caragana arborescens* grows in artificial plantations at lower altitudes. The herb flora is very rich, with a dominance of different Rosaceae, Poaceae, Fabaceae, as well as endemic and sub-endemic Caryophyllaceae and Ranunculaceae. Some leafminers of this reserve have previously been reported (Sachkov et al. 1997) and the Nepticulidae fauna is rich and comprises *S. naturnella*, *S. microtheriella*, S. *paradoxa*, *S. oxyacanthella*, *S. hybnerella*, *S. floslactella*, *S. trimaculella*, *S. lemniscella*, *S. lonicerarum*, *S. basiguttella*, *Trifurcula beirnei* and *Ectoedemia* (*Zimmermannia*) *liebwerdella*.

Steppe biotopes

Beketovka. – Sandy and limestone hills with a dominance of herbaceous Rosaceae and Fabaceae. The collecting site is situated in an *Elaeagnus* plantation near the water. Nepticulidae collected here are *Stigmella thuringiaca*, *S. aceris* and *Trifurcula silviae*.

Mar'evka. – A steppe on salty clay, with *Limonium* and various Asteraceae. One collecting locality is situated in the middle of the steppe under the only *Salix triandra/alba* trees on a bank of a stream with *Phragmitis australis*. The collected Nepticulidae feed on *Salix* and *Populus*: *Stigmella zelleriella, S. obliquella, S. trimaculella* and *Ectoedemia hannoverella* and thus were probably all collected near this stream.

Vjazovka and 6 km S Vjazovka (fig. 5). – These very interesting localities are situated on the right bank of Volga in the so-called 'bayrachnyj les', valley-forest with a dominance of *Acer tataricum*, *Quercus robur*, *Rhamnus cathartica*, *Euonymus verrucosus*, *Prunus spinosa* and some *Prunus tenella*, *Caragana frutescens*, *Sorbus*

aucuparia and the vine *Aristolochia clematitis*. On the top of the slopes one finds a very hot clay- and salt-steppe, with a dominance of Chenopodiaceae (*Kochia*), a small shrubby *Artemisia* (*A. lerchiana*), *Atraphaxis spinosa*, *Ferula caspica*, *Allium* spp., *Tulipa* and some rare Fabaceae. In ravines grows a very rich vegetation with a dominance of mesophytic Fabaceae, *Fragaria, Peucedanum ruthenicum* and Poaceae. The Nepticulidae here are *Stigmella rolandi*, *S. hybnerella, S. plagicolella, S. roborella, S. samiatella* and *Ectoedemia liebwerdella*.

Volgograd area
Chapurnikovskaya balka. – This site has a very rich flora, with both forest and steppe vegetations. On the slopes of the gullies one finds a deciduous forest amidst the sub-zone of southern, desert-steppes. The dominant tree species are *Quercus robur*, *Ulmus* spp., *Alnus glutinosa*, *Salix* spp., *Populus nigra* and *P. tremula*. In addition there are plantations of *Pinus sylvestris*, *Robinia pseudoacacia* and *Caragana arborescens*. The steppe grassland is very rich, with a dominance of *Stipa* spp. and various other grasses, *Artemisia* spp., *Euphorbia* spp. and different Fabaceae. The nepticulid fauna comprises *Stigmella aceris*, *S. ulmiphaga, S. rolandi, S. obliquella, S. samiatella* and *Ectoedemia caradjai*.

Plantations in Kalmyk Republic. – The city park of Elista, and the oak forest SW of Yashalta are artificial plantations in a region of desert or semi-desert. There is no doubt that most or all species of Nepticulidae here on trees were introduced with their hosts, such as *Stigmella viscerella* and *Ectoedemia spinosella*.

SPECIES TREATMENTS

***Stigmella naturnella* (Klimesch, 1936)** New for European Russia

Astigmella dissona Puplesis, 1984 **syn. nov.**

Material. Samara: 1♂, Zhiguli, Bakhilova Polyana, 14.v.1992, SS. – Ul'yanovsk: 13♂, Pobedy, 19.iv.1995, under trunks of birch (*Betula* sp.), IV; 80 mines, some with larvae, Ul'yanovsk, Vinnovka, *Betula*, 9, 21, 30.ix.2002, MA, SU.

Remarks. By study of the holotypes of *S. naturnella* and *S. dissona* it has become clear that they are actually one species. The characters mentioned by Puplesis (1994) do not hold when more material is concerned, see fig. 24–26 for the male genitalia. The leaf-mines (fig. 8–10) of this species are best recognized by the absence of most diagnostic characters of other *Betula* miners. They resemble a short mine of *S. confusella* (Wood & Walsingham, 1894), or *S. luteella*, but the latter usually feeds partly in underside parenchyma, resulting in a greenish mine, and starts with a short contorted part.

The finding of *S. naturnella* in this part of Russia bridges the enormous distributional gap between central Europe, where it has been found in Italy, Austria, Czech Republic, Slovakia, Hungary and Russia: Primory'e. We assume that it has a continuous distribution with its host *Betula* throughout Siberia. A similar distribution is assumed

for other species feeding on birch, currently known from Europe and the Far East: *S. betulicola*, *S. luteella*, S. *sakhalinella* Puplesis, 1984, *S. continuella* and *Ectoedemia occultella*. Whereas *S. naturnella* is usually a rare species in central Europe, it seems here to be the commonest *Betula* miner.

***Stigmella lapponica* (Wocke, 1862)**

Material. Ul'yanovsk: 1♂, Aksakovo, 9–10.v.1996, in forest, ZV; 1♀, Yulovo, 30.iv.1994, IV; 1 mine, Ul'yanovsk, *Betula*, 9.ix.2002, SU; 2 mines with larvae, Vinnovka, *Betula*, vii–viii.2002, MA.

Remarks. A widespread species feeding on *Betula*, previously known from northern Russia, Murmansk, Karelia and Leningrad (Jürivete et al. 2000; Kozlov & Jalava 1994; Kutenkova 1989) but expected to occur all over Russia. It has also been recorded from Siberia: Chita (Kulishenko 1987) and Novosibirsk (Puplesis 1994). Leafmines are characteristic (fig. 6), even more so than the adults, which may be confused with *S. confusella*.

*** *Stigmella freyella* (Heyden, 1858)** New for Russia

Material. Ul'yanovsk: 5 mines, Tsemzavod, *Calystegia sepium*, mid vii.2003, MA.

Remarks. *S. freyella* is widespread in the more southern half of Europe, including the Crimea, Ukraine (Gerasimov 1952) and goes north to the Netherlands, Germany, Poland and Latvia. The leafmines are characteristic (fig. 11) and cannot be confused with anything else.

*** *Stigmella tiliae* (Frey, 1856)**

Material. Ul'yanovsk: 3 mines, *Tilia*, Ul'yanovsk, 9.ix.2002, SU; 10 mines, Vinnovka, *Tilia cordata,* vii–viii.2002, MA.

Remarks. Previously recorded from Tatarstan (Krulikowsky 1908) (marked with a question mark), Samara (Sachkov et al. 1997) and Krasnodar (Puplesis 1994); also in all neighbouring states. *S. tiliae* occurs probably everywhere with *Tilia*.

*** *Stigmella betulicola* (Stainton, 1856)**

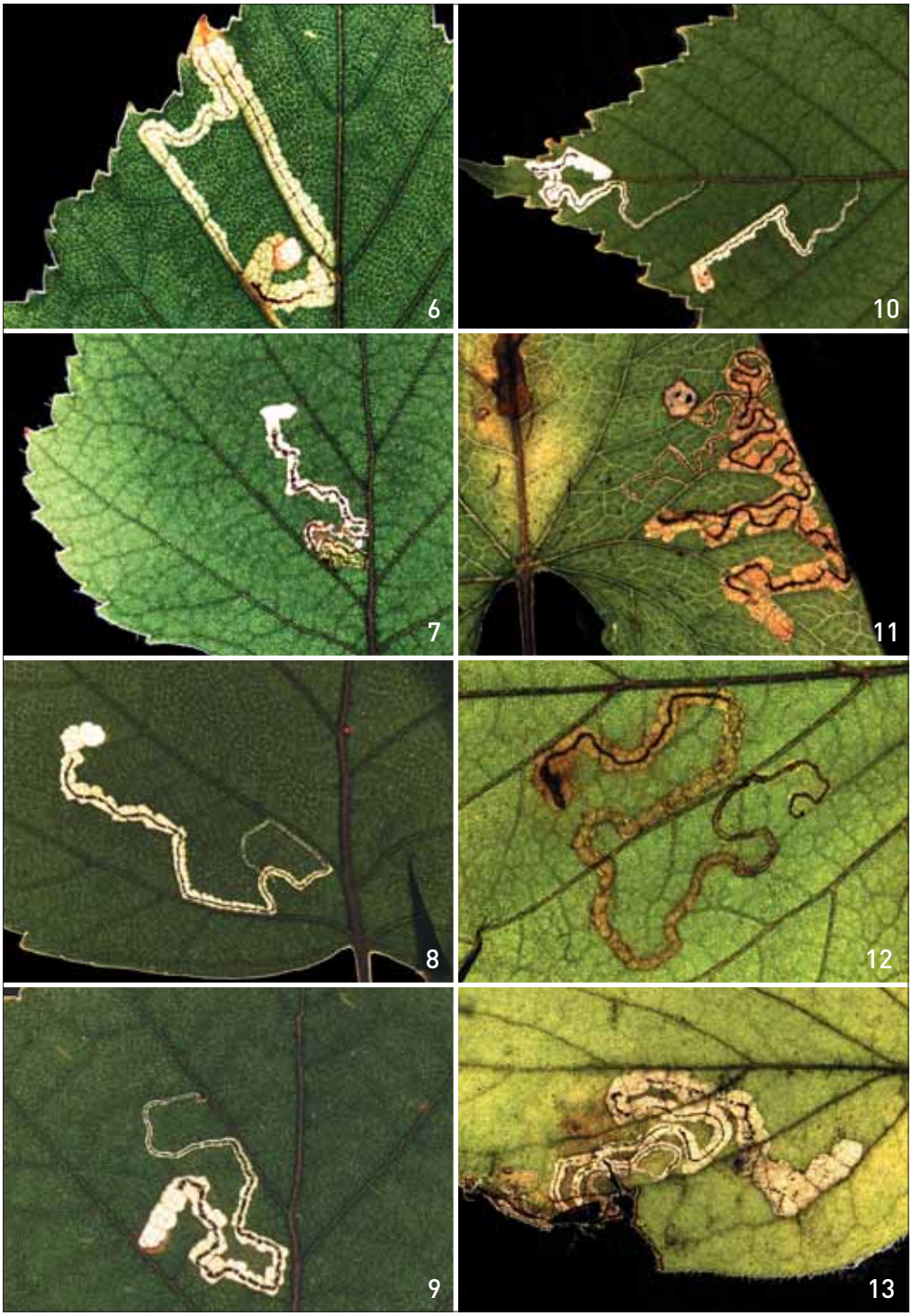
Material. Ul'yanovsk: 1 mine, Vinnovka, 21.ix.2002, MA.

Remarks. A widespread species, occurring throughout Europe to the far north and also in Japan and China (Kemperman et al. 1985; Nieukerken & Liu 2000). In Russia recorded from Murmansk, Karelia, Leningrad, Smolensk, Samara and Tatarstan (Jürivete et al. 2000; Kozlov & Jalava 1994; Krulikowsky 1908; Kutenkova 1989; Sachkov et al. 1997; Skala 1944). The mines are usually well identifiable, but since we only got a single mine here, confirmation is required. It feeds on *Betula*, and often occurs gregariously (more mines on one leaf) on seedlings and saplings of birch.

*** *Stigmella nivenburgensis* (Preissecker, 1942)** New for Russia

Material. Ul'yanovsk: 5 mines, Vinnovka, 21.ix.2002, *Salix cf triandra,* leg. MA.

Remarks. *S. nivenburgensis* occurs scattered in Central and East Europe, closest in Lithuania and Poland, and is also reported from Turkmenistan (Puplesis 1994). It is the only species in the *S. betulicola* species group feeding on *Salix*. The mines are narrow and straight (fig. 14), very different from those of the *S. salicis* group.



Figs. 6–13. Leafmines of *Stigmella* (all, except fig. 11, from Ul'yanovsk: Vinnovka). **6.** *S. lapponica* on *Betula*. **7.** *S. luteella* on *Betula*. **8–10.** *S. naturnella* on *Betula*. **11.** *S. freyella* on *Calystegia sepium* (Tsemzavod). **12.** *S. aceris* on *Acer tataricum*. **13.** *S. lonicerarum* on *Lonicera xylosteum*.

*** *Stigmella luteella* (Stainton, 1857)**

Material. Ul'yanovsk: 9 mines, Ul'yanovsk, Vinnovka, *Betula pendula*, 9–30.ix.2002, MA, SU.

Remarks. *S. luteella* is known from Karelia (Kutenkova 1989), and according to (Puplesis 1994) it occurs throughout Russia to Sakhalin. Leafmines are usually rather characteristic (fig. 7), being often partly in the lower mesenchym only, which makes the mine appear green from above. Some mines, however, may be difficult to separate from those of *S. betulicola* or *S. naturnella* (see above).

***Stigmella glutinosae* (Stainton, 1858)** New for Russia

Material. Ul'yanovsk: 1♂, Srednikovo, 6.vi.1998, ZV (EvN3485); 4 mines, Vinnovka, 21.ix.2002, *Alnus glutinosa,* leg. MA (fig. 27).

Remarks. *S. glutinosae* is widespread throughout Europe and occurs in all neighbouring states, but no pertinent records for Russia could be found. Gerasimov (1952) recorded it from the northern and central parts of the European part of the Soviet Union, but the latter at that time also included the Baltic republics and the Ukraine, from where the species is also known. The leafmines can easily be confused with those of *S. alnetella* (Stainton, 1856), although the mines recorded here have the wider frass line which is more characteristic for *S. glutinosae*. However, on the basis of mines alone the species would not have been recorded.

***Stigmella microtheriella* (Stainton, 1854)**

Material. Samara: 1♀, Samara, 8.vi.1998. – Ul'yanovsk: 1 mine, Vinnovka, 15.vii–15.viii.2001, MA; 4 mines, Ul'yanovsk, 9.ix.2002, SU; 4 mines, Vinnovka, vii–viii.2002, MA. All mines on *Corylus avellana*.

Remarks. *S. microtheriella* feeds on *Carpinus, Corylus* and *Ostrya*, and is the only known parthenogenetic *Stigmella*-species. It is widespread and abundant throughout Europe. Puplesis (1994) listed it as Russian, without detailed localities, and it has recently been cited from Zhiguli, Samara (Sachkov et al. 1997).

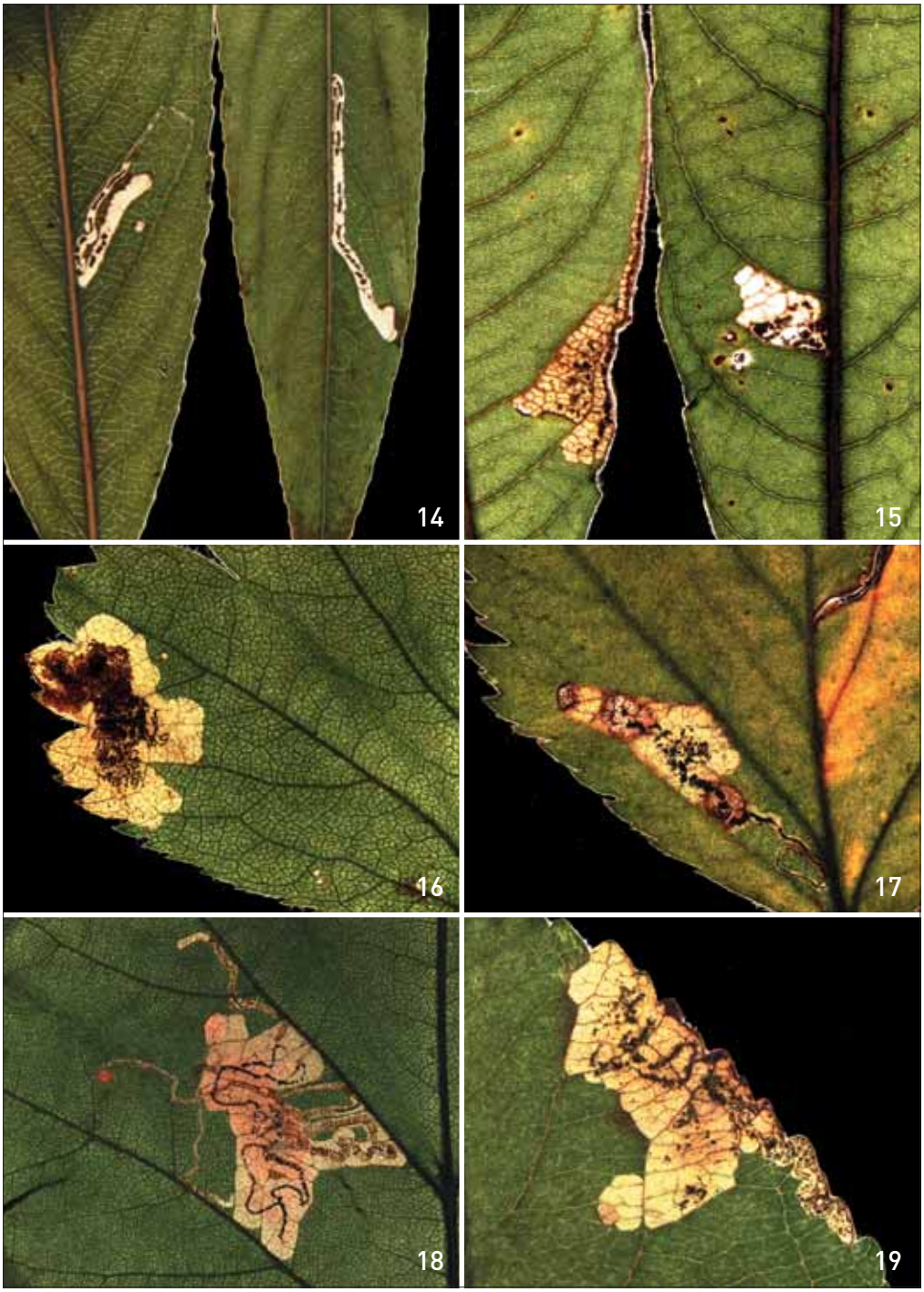
*** *Stigmella prunetorum* (Stainton, 1855)**

Material. Ul'yanovsk: 14 mines, Vinnovka, *Prunus domestica*/*P. spinosa*, 21.–30.ix.2002, MA; 7 mines, Vinnovka, *Prunus cerasus,* vii–viii.2002, MA.

Remarks. No detailed records from Russia have been published, although Puplesis (1994) records it from southern Russia. This record refers to adults from Belgorod (Borisovka) (R. Puplesis, pers. comm.). The mines are very characteristic (fig. 20) and easy to separate from sympatric *S. plagicolella* and *Ectoedemia spinosella*.

***Stigmella aceris* (Frey, 1857)**

Material. Ul'yanovsk: 1♂, Beketovka, 11.–13.vii.1998, Steppe, IV & IA; 2♂, 2♀, Pobeda 20.x.2002, under bark of Pinus, IA, KA; 4 mines, Ul'yanovsk city, *Acer platanoides*, 9.ix.2002, SU, 7 mines, Vinnovka, *Acer platanoides*, 15.vii.–15.viii.2001, vii.–viii.2002, MA; 18 mines, Vinnovka, *Acer tataricum,* vii.–viii.2002, MA. – Volgograd: 2 ♀, Chapurnikovskaya balka, 21.viii.1999, KD.



Figs. 14–19. Leafmines of *Stigmella* (all, except fig. 17, from Ul'yanovsk: Vinnovka). **14.** *S. nivenburgensis* on *Salix cf triandra*. **15.** *S. obliquella* on *Salix cf triandra*. **16.** *S. paradoxa* on *Crataegus* sp. **17.** *S. hybnerella* on *Crataegus ambigua* (Samara: Zhiguli). **18.** *S. perpygmaeella* on *Crataegus* sp. **19.** *E. atricollis* on *Malus domestica*.

Remarks. This species is common in Southern and Eastern Europe, feeding on *Acer campestre*, *A. platanoides* and *A. tataricum* (mines, fig. 12). From Russia previously recorded from 'southern Russia' (Puplesis 1994), which refers to Belgorod (1♂, 1♀ in ZIN: Borisovka, 1985, leg. Krivochatskij), and recently from Samara (Sachkov et al. 1997). Male and female genitalia are illustrated in figs. 28 and 47. The finding of adults as late as 20 October, under the bark of *Pinus*, indicates the possibility of hibernating adults, which was hitherto an unknown phenomenon in European Nepticulidae. However, they also may just be surviving stragglers from the summer generation.

*** *Stigmella malella* (Stainton, 1854)**

Material. Ul'yanovsk: 4 mines, Arbuzovka, 30.viii.2002, ZV; 15 mines, Ul'yanovsk city, 9.ix.2002, SU; 54 mines, Ul'yanovsk, Vinnovka, 9.–30.ix.2002, MA, SU. All on *Malus domestica*.

Remarks. This common pest of apple (*Malus*) has been reported from Stavropol, southern Ural (Puplesis 1994) and Krasnodar (Kozlov & Koricheva 1989, 1991). Chagelishvili (1972) reports it as a pest in Georgia, from Russia we do not know any report as pest. Leafmines may be confused with those of *S. desperatella*, which has green larvae in contrast to the yellow ones in *S. malella*. *S. desperatella* is not yet known from Russia, but appears to be common in the Caucasus (Puplesis 1994). Because of this the Georgian records need to be viewed with caution (R. Puplesis, pers. comm.).

*** *Stigmella catharticella* (Stainton, 1853)**

Material. Ul'yanovsk: 5 mines, Vinnovka, *Rhamnus cathartica*, 15.vii.–15.viii.2001; 2 mines, 21.–30.ix.2002, MA.

Remarks. A widespread European species, previously recorded from Russia without detail (eastern Europe, including southern Ural (Puplesis 1994). The mines are very characteristic and cannot be confused with those of the Central European *S. rhamnella* (Herrich-Schäffer, 1860), which feeds on the same host.

*** *Stigmella viscerella* (Stainton, 1853)**

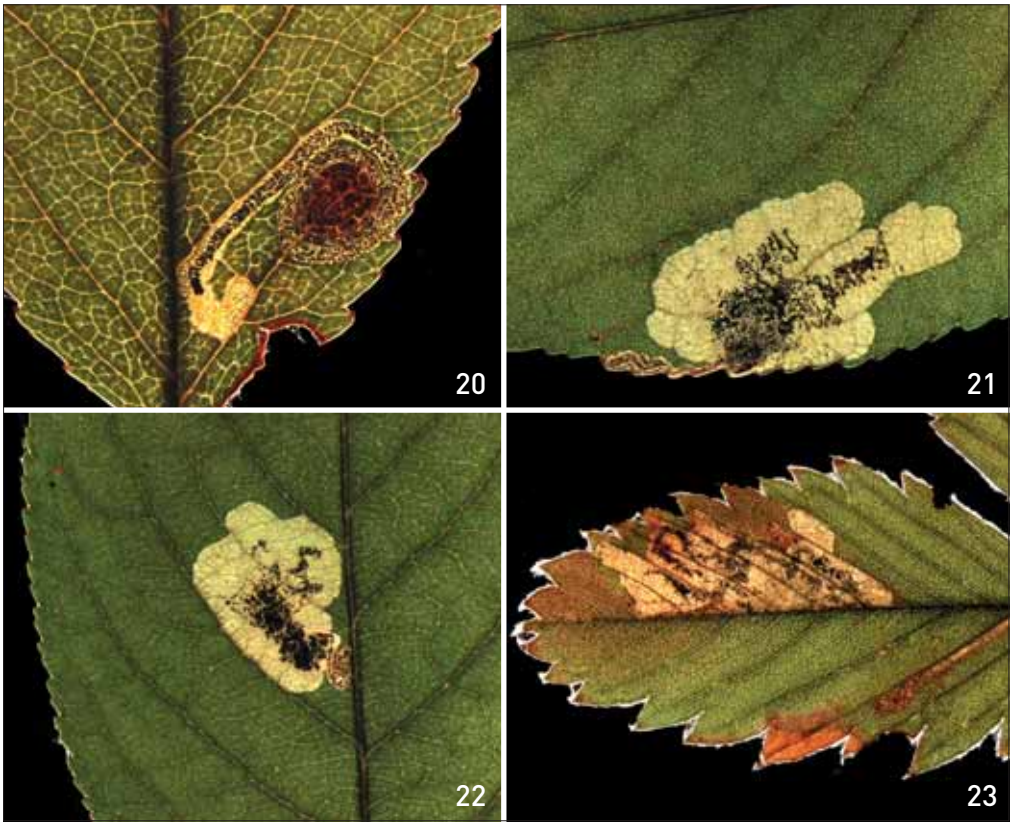
Material. Kalmyk Republic: mines, Ulmus sp., Elista, 26.ix.2000, ZV.

Remarks. A widespread European species, particularly in southern Europe. There is only one previous Russian record, of leafmines from Samara (Sachkov et al. 1997). The mines are very characteristic, but occasionally individual mines of *S. lemniscella* may resemble those of *viscerella*. However, in this case the large sample of similar mines and the absence of 'normal' *S. lemniscella* mines indicate that they are indeed *viscerella*.

***Stigmella ulmiphaga* (Preissecker, 1942)** New for Russia

Material. Astrakhan: 1 ♂, Karasuk, 31.v.1999, KD. – Volgograd: 1 ♂, Chapurnikovskaya balka, 21.viii.1999, KD (fig. 29).

Remarks. *Stigmella ulmiphaga* occurs scattered in South-East Europe from Austria to Greece, and is also known from Turkmenistan, where it is common (Puplesis 1994) and sometimes abundant (R. Puplesis pers. comm.).



Figs. 20–23. Leafmines of Nepticulidae (all from Ul'yanovsk: Vinnovka). **20.** *Stigmella prunetorum* on *Prunus spinosa*. **21–22.** *Ectoedemia spinosella* on *Prunus sp*. **23.** *E. arcuatella* on *Fragaria moschata*.

Unidentified mines on *Ulmus* from Elisha and Ul'yanovsk could either belong to this species, to *S. ulmivora* (Fologne, 1860) or to *S. kazakhstanica* Puplesis, 1991, which all make very similar mines. Sachkov (1996) recorded *S. ulmivora* from Samara, but these mines could also belong to *S. ulmiphaga*, although we think that the occurrence of *S. ulmivora* in the mesophytic forests of Samara and Ul'yanovsk is very likely.

Stigmella kazakhstanica Puplesis, 1991

Remarks. Previously reported on the basis of empty mines in Astrakhan (Puplesis et al. 1991), and is further known from nearby Kazakhstan and Turkmenistan (Diškus & Puplesis 2003). These mines actually could also have belonged to *S. ulmiphaga*, which makes similar mines.

Stigmella thuringiaca (Petry, 1904) New for Russia

Material. Ul'yanovsk: 5♂, Beketovka, 11.–13.vii.1998, steppe, IV & IA; 2♂, Vasil'evka, 9.–10.vi.1998, 17.–19.vii.1999, IA & IV.

Remarks. *S. thuringiaca* has a wide distribution in Southern and Central Europe, from Spain in the West, to Germany and Poland in the North. The nearest previously

known occurrence was in the Crimea, Ukraine (Puplesis 1994). The larva feeds on a number of herbaceous Rosaceae, such as *Potentilla* spp., *Fragaria* spp., *Sanguisorba minor, Agrimonia* and *Filipendula* spp., often on dry grassland biotopes. The steppe habitat in this area fits this picture. Mines are difficult to separate from other Rosaceae feeders: on *Potentilla* they can be confused with *S. tormentillella* (Herrich-Schäffer, 1860), on *Filipendula* with *S. filipendulae* (Wocke, 1871), and on *Sanguisorba* with *S. poterii* (Stainton, 1857), *S. rolandi*, *S. anomalella* (Goeze, 1783) and *S. centifoliella* (Zeller, 1848).

***Stigmella rolandi* Van Nieukerken, 1990** New for Russia

Material. Ul'yanovsk: 3♂, Vjazovka 6 km S, 5.–6.viii.1998, ZV. – Volgograd: 1♂, 2♀, Chapurnikovskaya balka, 21.viii.1999, KD (figs. 30–31).

Remarks. *S. rolandi* is widespread in southern Europe, north to Germany and east to Ukraine, and also in the Tyan Shan mountains in Kazakhstan (Puplesis et al. 1992). It feeds on *Rosa* and *Sanguisorba*.

*** *Stigmella paradoxa* (Frey, 1858)** New for Russia

Stigmella juryi Puplesis, 1991: 125. **syn. nov.**

Material. Samara: 3 mines, Zhiguli, *Crataegus ambigua*, 5.x.2003, ZV. – Ul'yanovsk: 9 mines, Vinnovka, *Crataegus* sp., vii.–viii.2002, MA.

Remarks. *Stigmella juryi* was described from the Crimea and Turkmenistan on the basis of adults collected at light. Later A. Diškus discovered that *S. juryi* makes similar mines on *Crataegus* as *S. paradoxa* (R. Puplesis & A. Diškus, pers. comm.). By comparing a series of Western European *S. paradoxa* and paratypes of *S. juryi* (in RMNH), it appeared that the difference given by Puplesis (1991), large anterior processes of gnathos in *S. juryi* does not hold: these processes are similar in many specimens of *S. paradoxa*, and are variable as well; moreover, also the way of mounting the genitalia influences the appearance of these processes. On suggestion of R. Puplesis (in litt.) we therefore synonymise *S. juryi* here.
Although *S. paradoxa* is widespread in Europe, it is usually one of the rarer species feeding on *Crataegus*. It has not been recorded from Russia before, the closest occurrence is in Ukraine (Crimea) and Moldova; it also occurs commonly in Turkmenistan (paratypes of *S. juryi*), and recently it has also been recorded from Iran (Laštůvka & Huemer 2002). The mines are unmistakeable (fig. 16), the rather similar mines of *Leucoptera malifoliella* (O.-G. Costa, 1836) differ by the concentric circles of frass and by the shape of the egg-scale which is a rounded cap-like structure in Nepticulidae, but has a flat surface and vertical sides in *Leucoptera*.

***Stigmella magdalenae* (Klimesch, 1950)**

Material. Ul'yanovsk: 11♂, 8♀, Aksakovo, 9.–10.v.1996, ZV; 6 mines, *Sorbus aucuparia*, 10 km NE Staraya Mayna, 15.vi.–1.vii.2001, MA; many mines, Tushna, *Sorbus aucuparia*, 1.ix.2002, leg. ZV; 9 mines, Vinnovka, *Sorbus aucuparia*, vii.–viii. 2002, MA.

Remarks. This species is particularly common in northern parts of Europe, but more to the south confined to the mountains. In Russia it was known from Leningrad

(Kozlov 1996). *Sorbus aucuparia* is the best known host, but it also occurs on other *Sorbus* spp., *Cotoneaster, Malus* and *Amelanchier* (Johansson & Nielsen 1990). Leafmines can usually be separated from those of *S. nylandriella* by the much smaller size and the usually narrower frass. Also, mines of *S. magdalenae* often occupy only a small portion of the leaflet, whereas those of *S. nylandriella* usually run throughout a leaflet.

*** *Stigmella nylandriella* (Tengstrôm, 1848)**

Material. Ul'yanovsk: 1 mine, *Sorbus aucuparia*, Staraya Mayna, 15.vi.–1.vii.2001, MA; 4 mines, Tushna, *Sorbus aucuparia*, 1.ix.2002, ZV.

Remarks. *S. nylandriella* is widespread in Europe on *Sorbus aucuparia*, with a wider distribution than *S. magdalenae*. In Russia it has been recorded from Bryansk, Murmansk, Karelia, Leningrad and Voronezh (Jürivete et al. 2000; Kozlov 1996; Kozlov & Koricheva 1990, 1991; Kozlov & Jalava 1994; Kutenkova 1989; Skala 1944), although it is possible that some of these records are misidentifications of *S. magdalenae*. The mines recorded here look like a normal *S. nylandriella* mine, so most likely belong indeed to this species. However, confirmation by adults would be welcome.

*** *Stigmella oxyacanthella* (Stainton, 1854)**

Material. Samara: 1 mines, Zhiguli, *Malus*, 5.x.2003, ZV. – Ul'yanovsk: 2 mines, Vinnovka, *Pyrus communis*, 21.ix.2002, MA.

Remarks. *S. oxyacanthella* is a widespread European species, feeding on a number of Rosaceous trees. Mines are usually easy to recognize, but there is some doubt for those on *Pyrus*, where several rather similar species occur (see below). The mine on *Malus* almost certainly is *S. oxyacanthella*, but a reared adult is still needed for a final confirmation. In Russia it was hitherto only recorded from Leningrad (Kozlov 1996).

***Stigmella hybnerella* (Hübner, 1813)** New for Russia

Material. Samara: 5 mines, Zhiguli, *Crataegus ambigua*, 5.x.2003, ZV. – Ul'yanovsk: 1♀, Vjazovka, 6 km S, 5.–6.viii.1998, steppe, ZV [gen. lost]

Remarks. *Stigmella hybnerella* is a very common and widespread *Crataegus* feeding species, occurring from Europe eastwards to Turkmenistan. It is therefore surprising that no previous records for Russia exist. Puplesis (1994) reports the species from the Baltic States, Ukraine, Azerbaijan and Turkmenistan. The mine is easily recognizable (fig. 17).

*** *Stigmella floslactella* (Haworth, 1828)**

Material. Samara: 4 mines, Zhiguli, 5.x.2003, ZV. – Ul'yanovsk: 4 mines, Vinnovka, *Corylus avellana*, vii.–viii.2002, MA.

Remarks. A widespread European species, previously recorded as leafmines from Bryansk (Skala 1944) and Samara (Sachkov et al. 1997). The mines are separated from those of *S. microtheriella* by the larger size, the more sinuous course and the wide frass. With larvae it is even easier: those of *floslactella* feed with the dorsum

upwards, and have a dark headcapsule and prothoracic plate, whereas *S. microtheriella* feeds with venter upwards and has a pale head and prothorax.

*** *Stigmella salicis* (Stainton, 1854)**

Material. Ul'yanovsk: 16 mines, pos. Karamzina, *Salix caprea*, mid vii.2003, MA; 4 mines, Vinnovka, *Salix caprea* and *Salix* sp., vii.–viii.2002, MA.

Remarks. This is one of the most widespread and commonest Nepticulidae in Europe, in Russia known from Smolensk, Karelia, Murmansk and Samara (Kozlov & Jalava 1994; Kutenkova 1989; Sachkov et al. 1997; Skala 1944). The earlier report from the Tyan-Shan is incorrect: these specimens have later been described as *Stigmella johanssoni* Puplesis & Diškus, 1996 (Puplesis 1994; Puplesis & Diškus 1996). *S. salicis* feeds on the 'sallow-type' of *Salix*: *S. caprea, S. cinerea* and *S. aurita* and a few others. However, it is possible that *S. vimineticola* (Frey, 1856) has a wider host-range and distribution than previously thought (see Aarvik et al. 2001), so that there is a slight possibility that leafmines could be confused.

***Stigmella zelleriella* (Snellen, 1875)**

Material. Ul'yanovsk: 3♂, Mar'evka, 20.–23.vii.1999, IA & IV.

Remarks. *S. zelleriella* occurs in coastal dunes along the North Sea and the Baltic Sea on *Salix repens*, and on the other hand in northern Europe in mountain tundra on *Salix lapponum* (Johansson & Nielsen 1990). In Russia one specimen has been recorded from Murmansk: Kola Peninsula, in a peat bog (Kozlov & Jalava 1994), close to its occurrence in Fennoscandia, and it is also recorded from Leningrad (Jürivete et al. 2000), probably along the Baltic Sea. The present record is far apart from any previous one, suggesting its more widespread occurrence in Russia. This locality is actually rather atypical, in a river-valley forest with tall *Salix* species (most likely *S. triandra*) and without any of the known hosts. We assume therefore that *S. zelleriella* feeds here on *S. triandra*, a previously unknown host.

***Stigmella obliquella* (Heinemann, 1862)** New for European Russia

Material. Ul'yanovsk: 3♂, 2♀, Mar'evka, 21.–23.vii.1999, Steppe, IA & IV; 1♂, 1♀, Vasil'evka, 9.–10.vi.1998, ZV; 1 mine, *Salix* cf. *triandra*, Vinnovka, 21.ix.2002, MA; 22 mines, Vinnovka, narrow-leaved *Salix*, vii.–viii.2002; 7 mines, Sviyaga, mid vii.2003, MA. – Volgograd: 1 ♂, Chapurnikovskaya balka, 21.viii.1999, KD.

Remarks. This species is widespread in Europe, feeding on narrow leaved *Salix*-species, such as *Salix alba*, and is also found in eastern Asia, Primory'e (Puplesis & Diškus 2003) and China (Van Nieukerken unpublished). There are no previously published records from the European part of Russia (Puplesis 1994: probably in western part of Russia), but the senior author observed mines, most likely of this species, in St. Petersburg (Vasiljevskiy Ostrov), 19.x.1985, on *Salix fragilis*. The records here show that it is common in the Volga valley from north to south. Because *S. zelleriella* now appears also to be able to feed on the same narrow-leaved *Salix* species, there is still some doubt about the identification of the leafmines (fig. 15). Male genitalia are illustrated in fig. 34.

Stigmella trimaculella (Haworth, 1828)

Material. Samara: 1 mine, Zhiguli, *Populus nigra*, 5.x.2003, ZV. – Ul'yanovsk: 1♀, Mar'evka, 21.–23.vii.1999, IA & IV; many mines, Vinnovka, *Populus nigra* and *balsamifera*, 15.vii.–15.viii.2001, vii.–21.ix.2002, MA.

Remarks. This widespread *Populus*-miner was previously recorded from Tatarstan (Krulikowsky 1908), southern Ural (Puplesis 1994) and mines from the North Ossetian ASSR (Utech 1962). It occurs also in the Leningrad region and Siberia: Novosibirsk (R. Puplesis, pers. comm.).

* *Stigmella assimilella* (Zeller, 1848)

Material. Ul'yanovsk: 1 mine, Kalinovka, end viii.2002, RS; 2 mines, Vinnovka, vii.–viii.2002, MA; 1 mine, Sviyaga, mid-vii.2003, MA, all on *Populus tremula*.

Remarks. *S. assimilella* is nowhere very common, but widespread with its host *Populus tremula*, and in Russia previously reported from Samara and Kaluga (Sachkov et al. 1997; Shmytova 2002) and also extends to the southern Ural and Primorskiy Kray (Puplesis 1994).

Stigmella sorbi (Stainton, 1861)

Material. Ul'yanovsk: 1♀, Yulovo, 1994, IV; 2♂, Aksakovo, 9.–10.v.1996, ZV; 1♂, 1♀, Ul'yanovsk region without exact data, summer 2001, IV; 3 mines, *Malus domestica*, Vinnovka, 2001, MA; 29 mines (some with larvae), Vinnovka, *Sorbus aucuparia*, vii.–viii.2002, MA.

Remarks. A very common boreal species, previously cited from Murmansk, Karelia, Leningrad, Kaluga and Tatarstan (Kozlov 1996; Kozlov & Koricheva 1991; Kozlov & Jalava 1994; Krulikowsky 1908; Kutenkova 1989; Shmytova 2001, 2002), and also known from Siberia: Chita (Kulishenko 1987). Common on mountain ash (*Sorbus aucuparia*), but also on *Malus, Cotoneaster* and sometimes other Rosaceae.

Stigmella plagicolella (Stainton, 1854)

Material. Kalmyk Republic: 3 mines, *Prunus spinosa* and *P. domestica*, Elista, 26.ix.2000, ZV. – Ul'yanovsk: 1♀, Vjazovka, 15.–16.vii.1999, IA & IV; 4 mines, Ul'yanovsk, *Prunus spinosa*, 9.ix.2002 SU; 8 mines, Vinnovka, *Prunus* sp., vii.–viii, 21.ix.2002, MA.

Remarks. This very widespread and common European species was previously recorded from Leningrad (Jürivete et al. 2000) and also occurs in the Caucasus (Puplesis 1994).

* *Stigmella lemniscella* (Zeller, 1839)

Material. Samara: 2 mines, Zhiguli, 5.x.2003, ZV. – Ul'yanovsk: 1 mines, Ul'yanovsk, *Ulmus,* 9.ix.2002 SU; 27 mines, Vinnovka, *Ulmus*, vii.–viii.2002, MA.

Remarks. Widespread throughout Europe. Previously reported from mines in Bryansk (Skala 1944), and Samara (Sachkov et al. 1997); according to Puplesis (1994) also in southern Russia, referring to material from Belgorod (Borisovka, 2 ♂, viii.1985, Krivochatskij, ZIN).

* *Stigmella continuella* (Stainton, 1856)

Material. Ul'yanovsk: 1 mine, *Betula*, Vinnovka, 21.ix.2002, MA.

Remarks. A widespread but usually rare species on *Betula*, previously only cited from Karelia (Kutenkova 1989) and Primorskiy Kray (Puplesis 1994). Mines very characteristic.

***Stigmella aeneofasciella* (Herrich-Schäffer, 1855)**

Material. Ul'yanovsk: 1♀, Ryabina, 31.v.1993, ZV; 5 mines, Arskoe, *Agrimonia eupatoria*, 20.viii.2003, MA; 5 mines, Vinnovka, *A. eupatoria*, vii.–viii.2002, MA.

Remarks. Known from Karelia and Murmansk (Kozlov & Jalava 1994; Kutenkova 1986). *Stigmella aeneofasciella* is widespread in Europe, and also known from most neighbouring countries. It is most commonly found on *Agrimonia*, but can also be found on *Potentilla* and *Fragaria*.

*** *Stigmella perpygmaeella* (Doubleday, 1859)** New for Russia

Material. Ul'yanovsk: 2 mines, Vinnovka, *Crataegus* sp., vii.–viii.2002, MA.

Remarks. This widespread *Crataegus* miner has not previously been recorded from Russia, although it is common in the neighbouring countries. Mines (fig. 18) can usually be identified, but confusion with *S. crataegella* (Klimesch, 1936) is still possible. Confirmation by adults is therefore needed.

*** *Stigmella incognitella* (Herrich-Schäffer, 1855)**

Material. Ul'yanovsk: 1 mine, Kalinovka, *Malus*, late viii.2002, RS.

Remarks. *S. incognitella* is widespread, but overall rarer than *S. malella* on the same host. Previously only recorded from Leningrad (Jürivete et al. 2000).

*** *Stigmella lonicerarum* (Frey, 1856)**

Material. Ul'yanovsk: 4 mines, Vinnovka, *Lonicera xylosteum*, 30.ix.2002, MA.

Remarks. *S. lonicerarum* occurs in most Central European countries, and goes northwards to Sweden, Finland and Estonia. There is one previous record from Russia and the Volga region, also based on leafmines: Samara, Zhiguli reserve (Sachkov et al. 1997). Leafmines (fig. 13) are easy to separate from the common Agromyzidae mines on the same host.

*** *Stigmella basiguttella* (Heinemann, 1862)**

Material. Kalmyk Republic: 2 mines, *Quercus robur*, Yashalta, 25.ix.2000, ZV. – Samara: 2 mines, Zhiguli, *Quercus robur*, 5.x.2003, ZV. – Ul'yanovsk: 3 mines, Vinnovka, *Quercus robur*, vii.–viii+21.ix.2002, MA.

Remarks. Previously reported from Smolensk, Belgorod, the Kalmyk republic (van Nieukerken & Johansson 2003; Skala 1944), and Samara (Sachkov et al. 1997). The Ul'yanovsk records appear on the map in van Nieukerken & Johansson (2003), but were inadvertently not listed in the material. This is the only European *Quercus* mining *Stigmella* species of which mines can be identified with certainty.

***Stigmella samiatella* (Zeller, 1839)**

Material. Ul'yanovsk: 1♂, Shikovka, 20.vii.1993, ZV; 1♂, Vjazovka, 6 km S, 29.v.–3.vi.2000, ZV. – Volgograd: 2♀, Chapurnikovskaya balka, 25.vii + 21.viii.1999, KD; 1 ♂, Tumak, 22.vii.1997, KD.

Remarks. Apart from these provinces also recorded from Belgorod and Kaluga (van Nieukerken & Johansson 2003; Shmytova 2001, 2002).

***Stigmella roborella* (Johansson, 1971)**

Material. Ul'yanovsk: 1♂, Vjazovka, 15.–16.vii.1999, IA & IV

Remarks. Only known in Russia from Ul'yanovsk and Kaliningrad (van Nieukerken & Johansson 2003; Puplesis 1994). Leafmines can not be identified with certainty. Some mines collected in Kalmyk Republic, Elista, could belong to this species, but other species are still possible.

***Trifurcula* (*Trifurcula*) *puplesisi* Van Nieukerken, 1990**

Remarks. One male from Sarepta (Volgograd) collected by Christoph was attributed with some doubt to this species (van Nieukerken 1990). We did not find it again.

***Trifurcula* (*Trifurcula*) *subnitidella* (Duponchel, 1843)** New for Russia

Material. Cheliabinsk: 1♀, Arkaim 9.vii.1997, NK & JJ (coll. Junnilainen).

Remarks. Widespread throughout Europe, previously recorded from Ukraine (Crimea) and Estonia (van Nieukerken 1990, 2004). The record in the Urals extends the distribution far to the East. The hostplant, *Lotus*, in which it makes stem-mines, is widely distributed all over Russia. The single female (fig. 48) corresponds well in all details with material from Western Europe.

***Trifurcula* (*Trifurcula*) *silviae* Van Nieukerken, 1990** New for Russia

Material. Ul'yanovsk: 2♂, Beketovka, 11.–13.vii.1998, IV & IA (fig. 35).

Remarks. *T. silviae* was originally described from a number of localities in the French Alps, but later also found in very disjunct localities in Spain and Latvia (van Nieukerken et al. 1996). Recently it was also found in Austria and the Czech republic (Liška et al. 2002, A. & Z. Laštůvka, pers. comm.). In Latvia the species was reared from *Onobrychis arenaria*, a plant also known from the Ul'yanovsk area. The present record sheds another light on the isolation of the Latvian occurrence: it is not unlikely that *T. silviae* actually is rather widespread on steppe habitats in Eastern Europe, of which the Latvian is a northernmost, albeit rather isolated, example.

***Trifurcula* (*Trifurcula*) *beirnei* Puplesis, 1984** New for Russia

Material. Samara: 1♀, Zhiguli, Bakhilova Polyana, 22.viii.1996, S. Sachkov (fig. 49).

Remarks. *T. beirnei* is known from a relatively small number of records from southern England, Denmark, Germany, Austria, Poland, Czech Republic, Slovakia and Hungary (Laštůvka & Laštůvka 1997; van Nieukerken 1996, 2004; van Nieukerken &

Johansson 1986). Although larvae are unknown, the species seems to be associated with *Genista*-species: *G. tinctoria, G. germanica* and *G. pilosa*. Of these, *Genista tinctoria* is common in the Volga area.

***Trifurcula* (*Trifurcula*) *pallidella* (Duponchel, 1843)**

Material. Ul'yanovsk: 1♂, Srednikovo, 19.vi.1994, ZV (figs. 39–40).

Remarks. *T. pallidella* is known from Central and Southeastern Europe. In Russia previously recorded from Saratov (Puplesis 1994) and also known from western Ukraine. The caterpillars make spindle shaped galls in stems of *Chamaecytisus* species (in some modern works regarded as *Cytisus* section *Tubocytisus*) and *Lembotropis* (Laštůvka & Laštůvka 1997). In the Ul'yanovsk region the only species of this group is *Chamaecytisus ruthenicus*, which we assume to be the host.

***Trifurcula* (*Trifurcula*) *chamaecytisi* Z. & A. Laštůvka, 1994** New for Russia

Material. Cheliabinsk: 1♂, Arkaim, 8.vii.1997, NK & JJ (coll. Junnilainen). – Ul'yanovsk: 2♂, Srednikovo, 10.–20.vii.1996, ZV; 2♂, same locality, 8.vi.1998, ZV; 1♂, Krjazh, 4.–10.vii.1998, IA & IV.

Remarks. *T. chamaecytisi* was only recently recognized as a species different from the very similar *T. immundella* (Zeller, 1839) (Laštůvka & Laštůvka 1994) and is known from Central eastern Europe (Austria, Czech and Slovak republics, Hungary), associated with various species of *Chamaecytisus*. The extension to the Volga and Ural regions conforms well with the distribution of this group of brooms, mapped together as '*Cytisus hirsutus*' (Sokolov et al. 1986), but usually considered as a group of species, of which *Chamaecytisus ruthenicus* occurs in the Ul'yanovsk region and in Arkaim (J. Junnilainen pers. comm.). Other *Trifurcula* species from the *immundella* species complex are not expected to occur in Russia, because the hosts are absent. For male genitalia see figs. 36–38.

*** *Bohemannia pulverosella* (Stainton, 1849)**

Material. Ul'yanovsk: 1 mine, Ul'yanovsk, *Malus*, 9.ix.2002 SU; 3 mines, Vinnovka, *Malus*, vii.–viii.2002, MA.

Remarks. Known from Leningrad (Puplesis 1994). Widespread throughout Europe. The mine may resemble that of *Ectoedemia atricollis*, see Van Nieukerken & Johansson (1990) for differences. *B. pulverosella* has usually ended feeding by mid-August, whereas *E. atricollis* larvae are usually not found before late August. The mine cited here from September was clearly an old mine.

*** *Ectoedemia* (*Etainia*) *sericopeza* (Zeller, 1839)**

Material. Ul'yanovsk: 3 mines in fruits of *Acer platanoides*, Vinnovka, 15.vii.–15.viii.2001, MA.

Remarks. *E.* (*E.*) *sericopeza* is a widespread species, the commonest of the subgenus, and has also been introduced in North America. In Russia it was known from Kaluga (Shmytova 2002) and Leningrad (Jürivete et al. 2000; Puplesis 1994). It feeds in the fruits of *Acer platanoides*, and the winter generation feed in shoots, petioles and buds.

*** *Ectoedemia* (*Fomoria*) *weaveri* (Stainton, 1855)**

Material. Ul'yanovsk: 3 mines with young larvae, Glotovka, *Vaccinium vitis-idaea,* 6.x.2002, NS.

Remarks. *Ectoedemia* (*Fomoria*) *weaveri* is a boreal species with a transpalaearctic distribution. It was previously cited from Murmansk in European Russia (Kozlov & Jalava 1994), and it occurs throughout to the Baikal, Chita and Yakutia regions in eastern Siberia (Bidzilya et al. 1998; Puplesis 1994). To this we can add Magadan even farther east and north in Siberia (Magadan, Upper Kolyna r., 500–1250m, 62°N – 149°40E, vii.1987, K. Mikkola, 7♂, Zoological Museum in Helsinki). Recently it was also recorded from Japan, Hokkaido (Kumata & Nakatani 1995).
E. weaveri feeds only on *Vaccinium vitis-idaea*, throughout winter, in the northernmost part of its distribution often during two years (van Nieukerken & Johansson 1990).

***Ectoedemia* (*Zimmermannia*) *liebwerdella* Zimmermann, 1940** New for Russia

Material. Samara: 1♂, Zhiguli, Bakhilova Polyana, 6.vii.1995, SS. – Ul'yanovsk: 2♂, Surulovka, 1.–3.vii.1997, IA & IV; 1♂, 6 km S Vjazovka, 5.–6.viii.1998, ZV.

Remarks. *Ectoedemia liebwerdella* occurs locally in Central and Southern Europe. It was originally described as a barkminer of *Fagus*, but many specimens have since been found in *Quercus* forests far away from *Fagus*, as is the situation here. These specimens we cannot separate from typical *E. liebwerdella*, although they usually are smaller. They differ from the closely related *E. atrifrontella* (Stainton, 1851) by the dark thorax and the larger humeral lobe and hairpencil of the hindwing. Male genitalia see figs. 41–42.

***Ectoedemia* (*Zimmermannia*) *longicaudella* Klimesch, 1953**

Material. Ul'yanovsk: 2♂, Akulovka, 24.vii.1999, IA & IV; 1♂, Surulovka, 1.–3.vii.1997, IA & IV; 1♂, Vasil'evka, 17.–19.vii.1999, IA & IV

Remarks. *Ectoedemia longicaudella* is another barkminer of *Quercus*, and of the three European species it is the commonest and most widespread. It was known from Belgorod (Puplesis 1994) and Kaluga (Shmytova 2002). Male genitalia see figs. 43–44.

***Ectoedemia* (*Ectoedemia*) *hannoverella* (Glitz, 1872)**

Material. Astrakhan: 1 ♂, Bogdo, 1997.05.09, KD. – Ul'yanovsk: 1♀, Mar'evka, 21.–23.vii.1999, IA & IV; 1♂, Vasil'evka, 9.–10.vi.1998, ZV; 1♂, Ul'yanovsk city, 20.vi.1990, ZV; 10 mines with larvae, Vinnovka, *Populus nigra*, 21.ix.2002, MA.

Remarks. According to Puplesis (1994) distributed from central Europe to southern Siberia (Novosibirsk), but no further detail known. Therefore these are the first detailed records for European Russia. Widespread in Central Europe. Male genitalia see figs. 45–46.

*** *Ectoedemia* (*Ectoedemia*) *turbidella* (Zeller, 1848)**

Material. Ul'yanovsk: 14 mines with larvae, Vinnovka, *Populus alba*, 21.ix.2002, MA

Remarks. *E. turbidella* is widespread in Europe, in Russia only previously recorded from Leningrad (Jürivete et al. 2000). EvN found also mines in St Petersburg (19.x.1985).

***Ectoedemia* (*Ectoedemia*) *argyropeza* (Zeller, 1839)**

Material. Saratov: 3♀, Saratov, 6.v.1990, AV. – Ul'yanovsk: 5 mines + larvae, Vinnovka, *Populus tremula*, 30.ix.2002, MA. – Volgograd: 2♀, Sarepta, 19th century, Christoph (BMNH).

Remarks. A widespread Holarctic species, found in Russia abundantly in Leningrad, Moscow, Kaluga, Tatarstan and Kalinigrad (Jürivete et al. 2000; Krulikowsky 1908; Puplesis 1994; Shmytova 2002; Speiser 1903). *E. argyropeza* is parthenogenetic, males are extremely rare (Bond & van Nieukerken 1987). It occurs with *Populus tremula*, probably throughout Siberia, although up to now it is only recorded from Northeast China (van Nieukerken & Liu 2000).

***Ectoedemia* (*Ectoedemia*) *caradjai* (Groschke, 1944)** New for Russia

Material. Volgograd: 2♀, Chapurnikovskaya balka, 21.viii.1999, KD (figs 50–51).

Remarks. A more southern species, common in southern and central Europe, north to Austria, southern Moravia (Czech Republic) and Ukraine. The mines were first discovered by Hering (1932) in Moldova, but his description was not available, because it was based on the 'work of an animal' after 1930 (International Commission on Zoological Nomenclature 1999). Feeds on several *Quercus* species.

***Ectoedemia* (*Ectoedemia*) *albifasciella* (Heinemann, 1871)**

Material. Ul'yanovsk: 1♂, Surulovka, 1.–3.vii.1997, IA & IV; 28 mines, Vinnovka, *Quercus robur,* 21.ix.2002+undated, MA. – Volgograd: 1♂, Sarepta, 22.v.1859, Christoph (BMNH).

Remarks. This miner of *Quercus* is widespread and often very abundant throughout Europe, but rarer in south. Previously recorded from Russia in Smolensk and Kaluga (Shmytova 2002; Skala 1944). Strictly spoken, males cannot be identified with certainty from *E. contorta* Van Nieukerken, 1985 or *E. pubescivora* (Weber, 1937). We, however, regard *E. albifasciella* as the most likely candidate for these localities. Mines of this species occur usually much earlier than the following species (August–September).

*** *Ectoedemia* (*Ectoedemia*) *subbimaculella* (Haworth, 1828)**

Material. Ul'yanovsk: 3 mines, Vinnovka, *Quercus robur,* 2002, MA.

Remarks. A similar distribution as the previous species, and often as abundant or even more. From Russia also recorded from Smolensk and Kaluga (Shmytova 2002; Skala 1944). The leafmines of *E. subbimaculella* are very characteristic by the slit on the underside; they occur much later than *E. albifasciella*, and are often found in green islands in fallen leaves, as was also here the case.

*** *Ectoedemia* (*Ectoedemia*) *atricollis* (Stainton, 1857)** New for Russia

Material. Ul'yanovsk: 28 mines, Vinnovka, *Malus domestica* + *Pyrus communis*, vii.–viii, 21.ix.2002, MA.

Remarks. A widespread European species, also occurring in Tajikistan, but probably as an introduction (Puplesis 1994). Not previously recorded from Russia. This is an

oligophagous species, feeding on a number of tree genera in Rosaceae (*Crataegus, Malus, Pyrus, Prunus* etc.) and on *Staphylaea* (Staphylaeaceae). Leafmine see fig. 19.

*** *Ectoedemia* (*Ectoedemia*) *arcuatella* (Herrich-Schäffer, 1855)**

Material. Ul'yanovsk: 34 mines, Vinnovka, *Fragaria moschata*, vii.–viii, 21.ix.2002, MA.

Remarks. This widespread European species has once been recorded as leafmines from Russia: Smolensk (Skala 1944). According to Puplesis (1994) possibly also in Tyan-Shan'. The mines on *Fragaria* are very characteristic (fig. 23), and cannot be confused with anything else.

***Ectoedemia* (*Ectoedemia*) *angulifasciella* complex**

Material. Ul'yanovsk: 1♂, Ryabina, 22.vi.1994, ZV.

Remarks. This male is in poor condition, and the colour of the head can no longer be determined. The specimen can belong to either *E. arcuatella*, *E. rubivora* (Wocke, 1860) or *E. atricollis*.

*** *Ectoedemia* (*Ectoedemia*) *spinosella* (Joannis, 1908) – New for Russia**

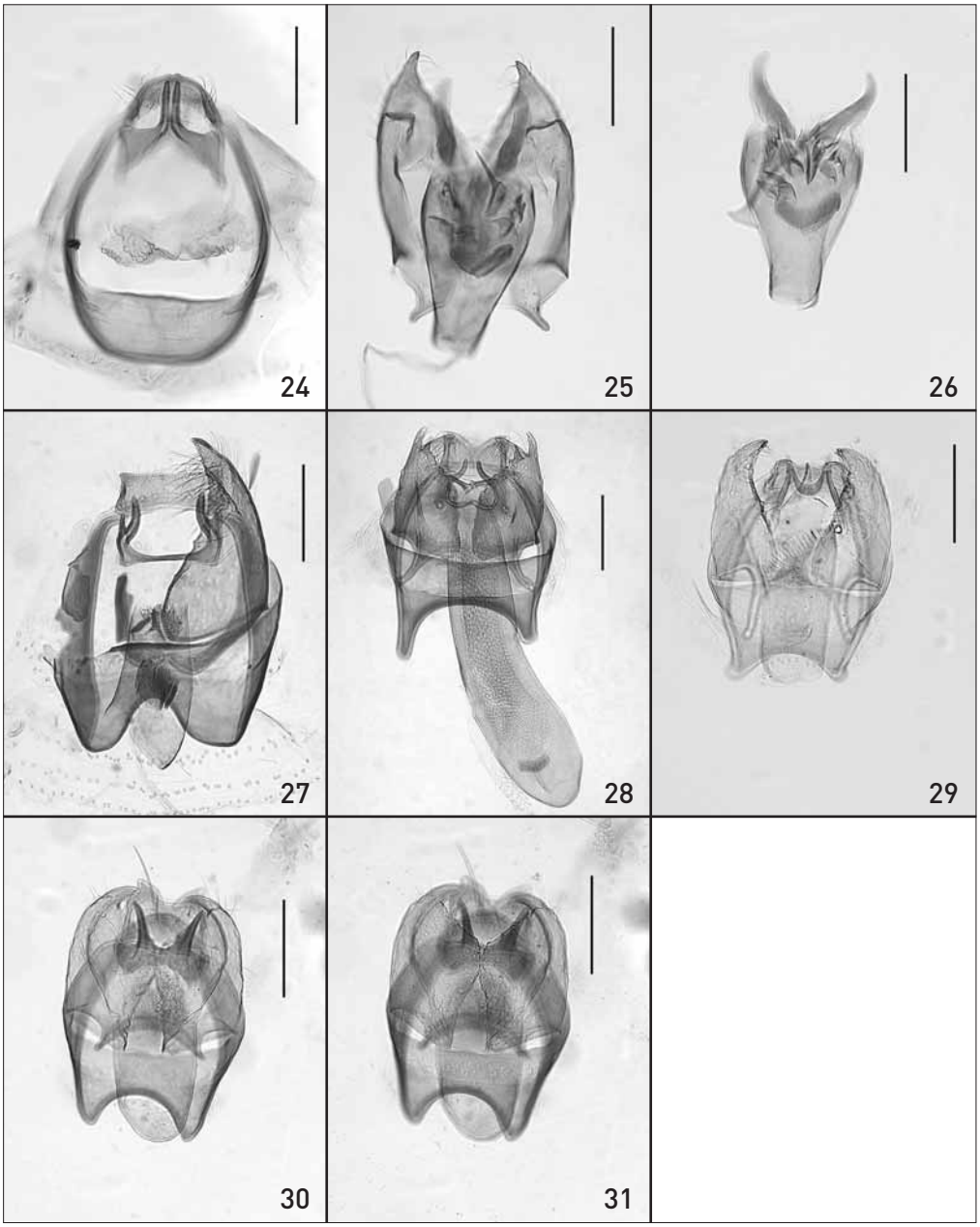
Material. Kalmyk Republic: mines, *Prunus* sp., Elista, 26.ix.2000, ZV. – Ul'yanovsk: 2 mines, Ul'yanovsk, *Prunus spinosa*, 9.ix.2002 SU; 32 mines, Vinnovka, *Prunus domestica* + *spinosa*, vii.–viii, 21.ix.2002, MA.

Remarks. *E. spinosella* is a more southern European species, reaching in the North to the southern part of Britain, The Netherlands, mid Germany and Poland. Gerasimov (1952) recorded it also from the Crimea, the Caucasus and European Part of the Soviet Union, but these records were not cited by Puplesis (1994); in the light of the present findings, they should be regarded as probably correct. Also common in western Turkmenistan (Puplesis et al. 1996). The mines are characteristic (figs. 21–22), and although they may sometimes be confused with *E. mahalebella* (Klimesch, 1936), the latter has never been found on *Prunus spinosa*. Still, confirmation by adults remains desirable.

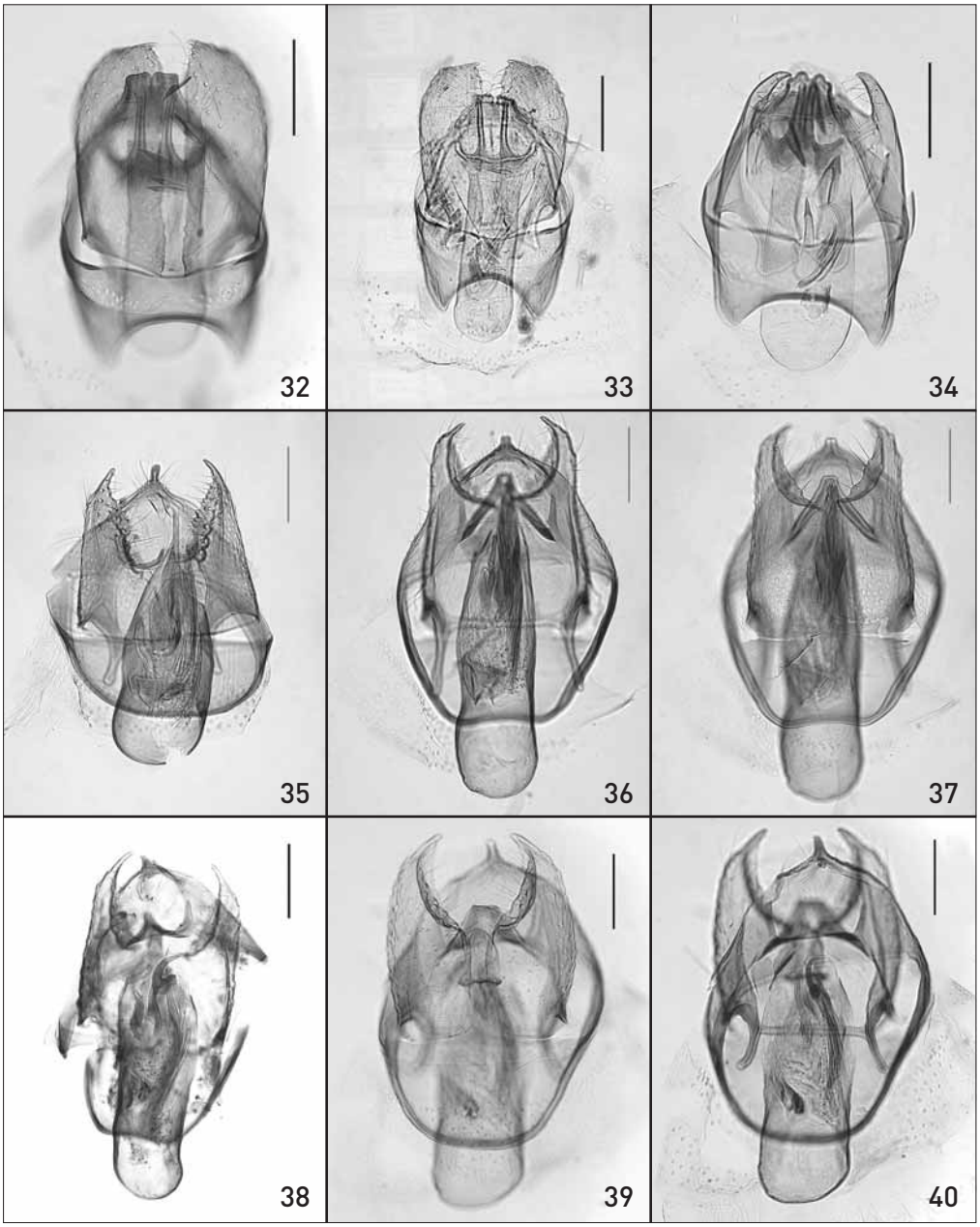
***Ectoedemia* (*Ectoedemia*) *occultella* (Linnaeus, 1767)**

Material. Ul'yanovsk: 1♂, Baryshskaya Sloboda, 10.–12.vii.1997, *Sphagnum* peat bog, IA & IV.

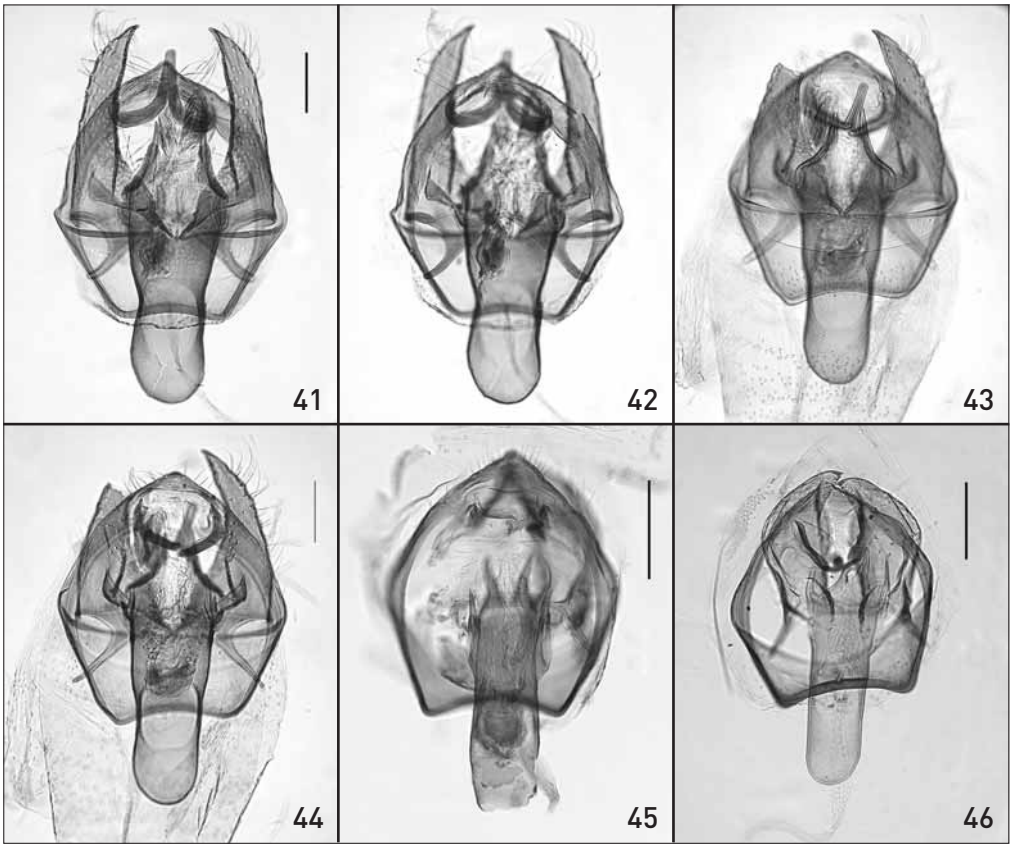
Remarks. *E. occultella* is one of the few Holarctic Nepticulidae species, throughout Europe, but also in Japan and North America (van Nieukerken 1985; Puplesis 1994). In Russia recorded from Murmansk, Karelia, Leningrad, Samara and Tatarstan (Jürivete et al. 2000; Kozlov & Jalava 1994; Krulikowsky 1908; Kutenkova 1989; Sachkov et al. 1997) and also as far east as Sakhalin (Puplesis 1994). It feeds normally on *Betula*, although it has occasionally been found on *Salix pentandra* in Finland. Very similar mines on Rosaceae in Nepal and Japan may also belong to this species.



Figs. 24–31. Male genitalia of Nepticulidae. **24–26.** *Stigmella naturnella*, Ul'yanovsk: Pobedy (EvN3302); Samara: Zhiguli (3303; fig. 26). **27.** *S. glutinosae*, Srednikovo (EvN3485). **28.** *S. aceris*, Ul'yanovsk: Pobedy (EvN3491). **29.** *S. ulmiphaga*, Chapurnikovskaya balka (EvN3329). **30–31.** *S. rolandi*, Chapurnikovskaya balka (EvN3332) (scale bars 100μm).



Figs. 32–40. Male genitalia of Nepticulidae. **32–33.** *Stigmella zelleriella*, Mar'evka (EvN3301, EvN3492). **34.** *S. obliquella*, Vasil'evka (EvN2997). **35.** *Trifurcula* (*Trifurcula*) *silviae*, Beketovka (EvN3294). **36–38.** *T.* (*T.*) *chamaecytisi*, Srednikovo (EvN3293) and Arkaim Reserve (EvN3400; fig. 38, **39–40.** *T.* (*T.*) *pallidella*, Srednikovo (EvN3300) (scale bars 100μm).



Figs. 41–46. Male genitalia of Nepticulidae. **41–42.** *Ectoedemia* (*Zimmermannia*) *liebwerdella*, Surulovka (EvN3313). **43–44.** *E.* (*Z.*) *longicaudella*, Akulovka (EvN3295). **45–46.** *Ectoedemia* (*E.*) *hannoverella*, Vasilev'ka (EvN3310) and Bogdo (EvN3339) (scale bars 100μm).

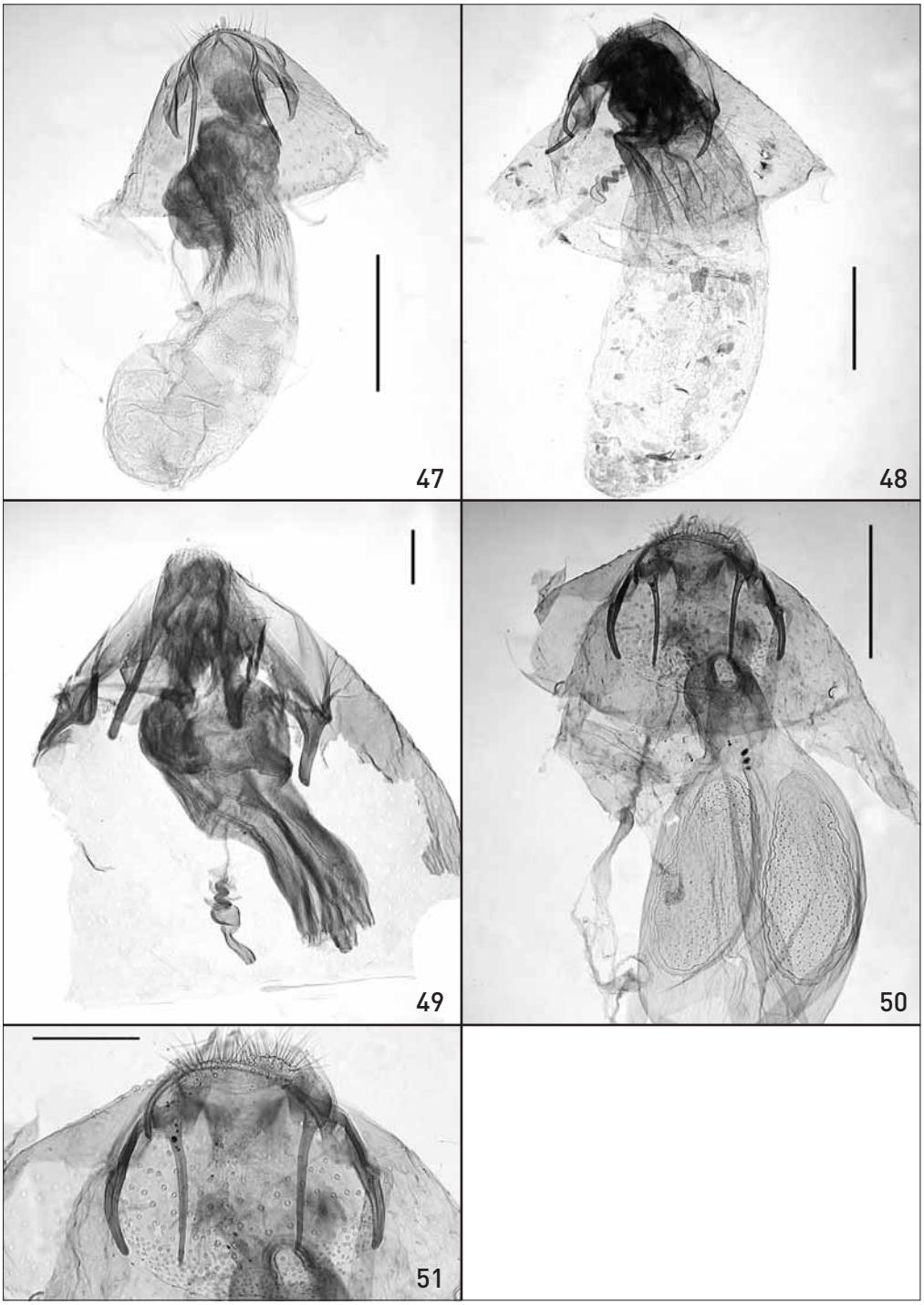
Doubtful records

We list here some leafmines, which we cannot identify with certainty, but which provide an insight in the total fauna.

Pyrus. – Kalmyk Republic: mines, *Pyrus communis*, Elista, 26.ix.2000, ZV. – Ul'yanovsk: 2 mines, Arbuzovka, 30.viii.2002, ZV; many mines, Vinnovka, vii.–viii.2002, MA.

The mines in Ul'yanovsk can be split more or less into two groups, which could belong to *Stigmella desperatella* (Frey, 1856) and *S. pyri* (Glitz, 1865); the material from the Kalmyk Republic resembles more *S. minusculella* (Herrich-Schäffer, 1855), but the mines cannot be identified with any certainty.

Puplesis (1994) records *S. minusculella* from southern Russia, based on material from Belgorod (R. Puplesis, pers. comm.), but the other two species have not yet been recorded from Russia, although *S. desperatella* is common in the Caucasus.



Figs. 47–51. Female genitalia of Nepticulidae. **47.** *Stigmella aceris*, Chapurnikovskaya balka (EvN3335). **48.** *Trifurcula* (*Trifurcula*) *subnitidella*, Arkaim Reserve (EvN3402). **49.** *T.* (*T.*) *beirnei*, Bakhilova Polyana (EvN3322). **50–51.** *Ectoedemia* (*E.*) *caradjai*, Chapurnikovskaya balka (EvN3337) (scale bars 200 μm for figs. 47, 48, 50, 100μm for figs. 49, 51).

Filipendula vulgaris. – Ul'yanovsk: 5 mines, Arskoe, 20.viii.2003, MA.
Leafmines in *Filipendula vulgaris* are normally not identifiable, and they could belong to either *S. thuringiaca* or *S. filipendulae* (Wocke, 1871). The latter is not yet known from Russia.
Rosa. – Ul'yanovsk: 7 mines, Tsemzavod, mid vii.2003, MA.
Stigmella mines on *Rosa* are usually undistinguishable, and could belong to either *S. anomalella* (Goeze, 1783) or *S. centifoliella* (Zeller, 1848). *S. rolandi* also feeds on *Rosa*, but has probably slightly different mines. *S. anomalella* is the most likely candidate here, it is reported from Leningrad and Samara (Puplesis 1994; Sachkov et al. 1997), and occurs further east in Tyan-Shan' and Primorskiy Kray (Puplesis 1994).

Rubus. – Ul'yanovsk: 1 mine, Ul'yanovsk city, 9.ix.2002, SU; 5 mines, Vinnovka, vii.–viii.2002, MA.
Mines of *Stigmella splendidissimella* (Herrich-Schäffer, 1855) and *S. aurella* (Fabricius, 1775) are very hard to distinguish, we therefore cannot attribute these mines with certainty to any of the species, although in view of the distribution the first seems the more likely candidate.

Ulmus. – Ul'yanovsk: 3 mines, Ul'yanovsk city, 9.ix.2002, SU.
We think that these mines belong most likely to *S. ulmivora* (Fologne, 1860), but since mines of *S. ulmiphaga* and *S. kazakhstanica* cannot be distinguished, we do not put any final identification to these mines. Similar mines from Samara have been reported as *S. ulmivora* (Sachkov et al. 1997).

Acknowledgements

We are grateful to the following collectors for providing us with the material: Vasily V. Anikin (Saratov), Jari Junnilainen (Vantaa, Finland), Sergey A. Sachkov (Samara) and Dmitry A. Komarov (Volgograd). We thank Rimantas Puplesis and Arunas Diškus (Vilnius) for much additional information and comments on an earlier version, and Kevin Tuck (Natural History Museum, London, BMNH), Lauri Kaila (Zoological Museum Helsinki) and Sergey Yu. Sinev (Zoological Institute of the Academy of Sciences, St. Petersburg, ZIN) for the loan of specimens.

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