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On the tribe Stenodemini (Hemiptera: Miridae: Mirinae) in Guilan province and adjacent areas (Iran)

Reza HOSSEINI

Abstract

This paper is continuing of a series of synoptic taxonomic treatments on the Miridae known from Guilan province, Iran. In the tribe Stenodemini (Mirinae) five genera are known from Guilan province and adjacent regions, including *Leptopterna*, *Stenodema*, *Notostira*, *Trigonotylus* and *Megaloceroea*. In this paper diagnoses, host-plant information, distribution data, and illustrated keys to the genera and species are provided. For all species, illustrations of the adults and selected morphological characters are provided to facilitate identification.

Key words: Miridae, Stenodemini, Taxonomy, Guilan province.

Zusammenfassung

Diese Arbeit setzt die Serie der Übersicht der taxonomische Bearbeitung der Miridae aus der Provinz Guilan im Iran fort. Vom Tribus Stenodemini (Mirinae) sind aus der Provinz und angrenzender Regionen fünf Genera bekannt: *Leptopterna*, *Stenodema*, *Notostira*, *Trigonotylus* und *Megaloceroea*. Weiters werden Diagnosen, Informationen über Wirtspflanzen, Verbreitungsdaten und illustrierte Schlüssel für die Genera und Arten angefügt. Für alle adulten Spezies sind Abbildungen und ausgewählte taxonomische Merkmale angefügt um die Bestimmung zu erleichtern.

Introduction

Mirid bugs (Hemiptera: Heteroptera) are one of the most species rich families of insects, with approximately 11.020 described species. This family comprising eight subfamilies which among them Mirinae subfamily has six tribes (CASSIS & SCHUH 2012).

Species in the tribe of Stenodemini have usually narrow, elongate body; more commonly greenish or yellowish. They live on grasses and sedges and are phytophagous. They are macropterous or brachypterous. Hemelytra of brachypterous specimens (*Leptopterna*, *Actitocoris*) is not shorter than one-third of abdomen length; in macropterous or submacropterous specimens, either cuneus separated by distinct fracture and membrane with 2 cells, or (*Teratocoris*) body green, or (*Actitocoris*) pronotum partly yellow (SCHWARTZ 2008).

So far there are a few taxonomic works has been done on Miridae bugs in Iran (HOSSEINI 1997, HOSSEINI & LINNAVUORI 2000, HOSSEINI et al. 2000, 2002a,b, HOSSEINI 2013 a,b (in press); LINNAVUORI & HOSSEINI 1998, 1999, 2000; LINNAVUORI 1999, 2006, 2007, 2009, 2010; ARKANI et al. 2011, LASHKARI et al. 2012, LASHKARI & HOSSEINI 2012, EBRAHIMI et al. 2012), but in future I hopefully expect to have an increasing in the number of interested young academic to work in this group of insects in Iran.

In this tribe five genera are known from Guilan province and its adjacent regions, including *Leptopterna*, *Stenodema*, *Notostira*, *Trigonotylus* and *Megaloceroea* (LINNAVUORI 2007). This work is continuing of a series of synoptic taxonomic treatments and re-description on the Miridae known from Guilan province, Iran. In this paper following information including diagnoses, host-plant information, distribution data, and illustrated keys to five genera (10 species) are provided. For most species, illustrations of selected morphological characters are provided to facilitate identification.

Material and Methods

Collection of specimens

The sweep net was used for collecting mirids on vegetation. The bugs felt on the net were quickly picked off by an aspirator. Then collected specimens were killed promptly in a small tube contains Ethyl acetate. Specimens after transferring to the laboratory were mounted on rectangular cards. All specimens were examined using an Olympus SZX 12 stereomicroscope. Illustrations of genitalia were prepared using a drawing tube attached to the stereomicroscope. Photographs of specimens were taken using a Canon EOS 500D (Digital Rebel/Kiss X3 Digital) camera equipped by a Canon EF 100mm f/2.8 USM Macro Lens. Identification was done by relevant taxonomic keys (WAGNER & WEBER 1964, WAGNER 1971). Identified species were confirmed by mirid specialist Dr. R.E. Linnavuori (Finland). All species are kept in the insect collection of the Natural Museum of University of Guilan.

Results

Key to the *Stenodemini* genera

- 1 Frons without medial longitudinal sulcus, Body longer than 7mm *Leptopterna*
- 1' Frons with medial longitudinal sulcus..... 2
- 2 Pronotum, and sometimes head, scutellum, and hemelytron distinctly and deeply punctate. Pronotum covering base of scutellum..... *Stenodema*
- 2' Dorsal surface either smooth, rugose or only finely, shallowly or obscurely punctate. Scutellum smooth or with transverse wrinkles. Pronotum with indistinct punctation, not covering base of scutellum..... 3
- 3 Hind tibiae with long, slender, erect setae, without spines. Not shorter than 7.5mm..... 5
- 3' Hind tibiae with very short recumbent setae, with short dark spines 4
- 4 Femora almost cylindrical, antennal segment I very long, length almost longer than combined length of head and pronotum *Megaloceroea*
- 4' Femora thicker at the bottom than the top. Antennal segment I shorter, about as long as length of head, antennal segment II without dark setae near base; dorsal surface without punctures, membrane of vesica usually with one basal process, Not more than 6.5 mm..... *Trigonotylus*
- 5 Frons protruded above base of clypeus in the form of triangle, truncate or slightly incised at apex, so that the Tylus is not visible from above *Notostira*

Leptopterna putshkovi VINOKUROV 1982 (Fig. 8-1)

Material examined: ARDABIL province: 20-30 km E of Khalkhal (37°37'49" N, 48°33'03" E, 1871 m), 21.vii.1996. It has been reported from TEHRAN province: Azad Bar, 2410 m a.s.l., 8.-10.vii.1996; Kandovan, 2550 m a.s.l., 3.-4.vii.1996 (LINNAVUORI 2007).

Diagnosis: Large and robust species, antenna and legs strongly hairy. Eyes removed from pronotum, Yellowish grey. Usually middle of head black. Two black stripes on pronotum and scutellum; inner margins of hemelytra often brown or black (Fig 1-A). Specific taxonomical diagnostic characters are shown in Table 1.

Table 1: Diagnostic taxonomical characters in *Leptopterna putshkovi*

Taxonomic characters	Ratio/Size (in mm)
Proportions among antennal segments	1.375: 3.6: 1.9: 0.75
Proportions among metatarsomeres	0.75: 0.35: 0.45
Diatone	1.25
Synthlipsis	0.625
Ocular index	2
Base of pronotum	2.05
1st antennal segment/ times as long as diatone	1.1
2 nd antennal segment/ times as long as diatone	2.88
2 nd antennal segment/ times as long as basal width of pronotum	1.756
Pronotum/ times as broad basally as long in middle	1.64
Body size	7.9-8.7

C o m m e n t s : On grasses in mountain meadows. Also known from Armenia and Azerbaijan (KERZHNER & JOSIFOV 1999).

Genus *Stenodema* LAPORTE

Greenish or yellowish, sometimes in median half brownish. Narrow, elongated. Head almost horizontal, triangular, prominent tylus. Vertex with a longitudinal groove. Eyes touching the anterior margin of pronotum. Punctuated scutellum. Almost always macropterous.

Key to the *Stenodema* species

- | | | |
|----|--|----------------------|
| 1 | Hind femora with 2 subapical teeth. (Subgenus <i>Brachystira</i> FIEB.)..... | <i>St. calcarata</i> |
| 1' | Hind femora without teeth. (Subgenus <i>Stenodema</i> LAP.)..... | 2 |
| 2 | Frons prolonged forward..... | <i>St. turanica</i> |
| 2' | Frons not prolonged forward..... | <i>St. laevigata</i> |

Stenodema (Brachystira) calcarata (FALLÉN 1807) (Fig. 8-2)

M a t e r i a l e x a m i n e d : GUILAN province: Damash (36°43'09" N, 49°47'40" E, elev. 1806 m), 27.vii.2002; Deylaman (36°53'05" N, 49°54'26" E, elev. 141 m), 16.-20.vii.1996; Gyssom (37°40'17" N, 49°02'46" E, elev. -19 m), 30.vi.-2.vii.1996; Manjil (36°44'25" N, 49°24'03" E, 302 m), 15.v.-14.vi.1995; Masuleh (37°09'14" N, 48°59'11" E, elev. 1023 m), 6.-26.vi.1995, 2.-28.vii.1996; Sang Rud (36°39'59" N, 49°42'06" E, 1338 m), 30.vi.-1.vii.2003. ARDABIL province: 20-35 km E of Khalkhal (37°37'49" N, 48°33'03" E, 1871 m), 1.-21.vii.1996, 27.vi.2002; Khalkhal – Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 22.vii.-4.viii.1996, 28.-29.vii.2004; Majareh – Kolor (37°31'46" N, 48°37'42" E, elev. 1919 m), 2.vii.1996.

It has been reported from ZANJAN province: 20-35 km E of Zanjan, 13.vii.2004. TEHRAN province: Azad Bar, 8.-10.vii.1995; Asara, 13.vii.2002; 10-15 km SE of Firuzkuh, 18.-19.vii.2003; Gachsar, 15.vii.2002; Kandovan, 3.-4.vii.1995 (LINNAVUORI 2007)

D i a g n o s i s : A color variation is observed in this species. Recently developed insects are always whitish yellow. In the summer generation, only to be light yellow brown, then it acquires brownish or blackish longitudinal stripes. After hibernating all females become green, while the males are colored in black (Fig. 1B). Hind femora with 2 subapical teeth (Fig. 1C). Dorsum usually black. Left paramer (Fig. 2A) sickle-shaped. Tip of the hypophysis needle-shaped (Fig. 2A). Right Paramer (Fig. 2B) club-shaped, Hypophysis pointed. Macropterous. Rarely brachypterous. Specific taxonomical diagnostic characters are shown in Table 2.

C o m m e n t s : This species lives on grasses and is found mostly in the humid habitats. Hibernating insects hide among the leaves and grass on the ground. Adults and larvae feed on the unripe grains of a number of grasses (WAGNER & WEBER 1964, WAGNER 1971).

Holopalaearctic (LINNAVUORI 2007). Recorded from Europe, Asia, North Africa (KERZHNER & JOSIFOV 1999).

Stenodema (Stenodema) laevigata (LINNAEUS 1758) (Fig. 8-3)

M a t e r i a l e x a m i n e d : GUILAN province: 40-50 km E of Khalkhal (37°38'33" N, 48°34'39" E, elev. 1980 m), 1.-21.vii.1996; Lounak (37°00'14" N, 49°51'50" E, elev. 973 m), 30.v.-24.vi.1995, 20.vii.1996; Masuleh (37°09'14" N, 48°59'11" E, elev. 1023 m), 6.-26.vi.1995, 28.vii.1996, 4.-5.viii.2002. ARDABIL province: 20-30 km E of Khalkhal (37°37'49" N, 48°33'03" E, elev. 1871 m), 1.- 22.vii.-4.viii.1006; Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 9.-11.viii.2002; Majareh – Khalkhal (37°34'06" N, 48°36'25" E, elev. 1951 m), 22.vii.1996.

D i a g n o s i s : More elongated and narrower than two other species, with longer antennae (Fig. 1D). Article II slightly longer than III and IV combined. Hind leg from the top narrows abruptly. Left paramere with vigorous, slightly curved hypophysis. Sensory lobe of left paramere smaller, the apophysis shorter and thicker (Fig. 2C). Right paramere longer and more slender (Fig. 2D).

Specific taxonomical diagnostic characters are shown in Table 2.

C o m m e n t s : The host plants are grasses, but less often live on grains, although this species is often commoner in damper habitats than *S. calcarata*. One generation per year. Adults hibernate in the leaves on the ground (WAGNER & WEBER 1964).

Holoarctic (LINNAVUORI 2007). Recorded from Europe, Asia, North Africa (KERZHNER & JOSIFOV 1999).

Stenodema (Stenodema) turanica REUTER 1904 (Fig. 8-4)

M a t e r i a l e x a m i n e d : GUILAN province: Damash- Bareth Sar (36°43'09" N, 49°47'40" E, elev. 1806 m), 27.vii.2002; Darreh Dasht (36°48'10" N, 49°38'24" E, elev. 1144 m), 26.-27.vii.2002; Deylaman (36°53'05" N, 49°54'26" E, elev. 141 m), 9.v.-24.vi.1995; Lowshan (36°38'09" N, 49°29'26" E, 323 m), 18.-20.viii.2002; Manjil (36°44'25" N, 49°24'03" E, 302 m), 20.-26.ix.2002; Masuleh (37°09'14" N, 48°59'11" E, elev. 1023 m), 6.-26.vi.1995, 4.-5.viii.2002; Nasir Mahaleh-Shaft (37°05'41" N, 49°18'56" E, 128 m), 14.-15.viii.2002; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 29.-30.vi.2003. ARDABIL province: Ganjgeh (37°42'26" N, 48°16'06" E, 1271 m), 9.-10.viii.2002; Ghareh Ghashlagh (39°19'30" N, 47°55'39" E, elev. 320 m), 27.-28.vii.2004; Khalkhal (37°37'57" N, 48°30'33" E, elev. 1765 m), 30.vii.1995, 10.-11.viii.2002, 29.vii.2004; 20-30 km E of Khalkhal (37°37'49" N, 48°33'03" E, elev. 1871 m), 1.-21.vii.1996, Khalkhal – Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 22.vii.-4.viii.1996, 8.-9.viii.2002; Khemes (37°31'35" N, 48°38'06" E, elev. 1930 m), 7.-9.vii.2002; Majareh – Kolor (37°31'46" N, 48°37'42" E, elev. 1919 m), 21.vii.1996, 15.ix.1998.

It has been reported from ZANJAN province: Abhar, 28.ix.-9.x.2000; 9-15 km W of Gilvan, 31.vii.-1.viii.2004; Mamalan – Abhar, 20.-21.vii.2002; Zanjan, 13.-14.vii.2004. TEHRAN province: Asara, 13.vii.2002; Azad Bar, 8.-10.vii.1995; 10-15 km SE of Firuzkuh, 18.-19.vii.2003, 2.vii.2004; Shahrestanak, 10.-12.vii.1995 (LINNAVUORI 2007).

D i a g n o s i s : This species is similar to *St. virens* but more elongated than it. Color yellowish grey or phosphorus. Frons prolonged forward (Fig. 1E). Inside of the rear tibia

with whitish hairs that are upright and long. Head short. First antennal segment as long as the wide of head. 2nd segment very long, more than 3× as long as the first and 2× as long as the 3rd and 4th together. Specific taxonomical diagnostic characters are shown in Table 2. Hypophysis of left paramere strong, bent and curved. Right paramere small (Fig. 2E, F).

C o m m e n t s : On grasses in meadows. Irano-Turanian. The Mediterranean only in North East. Reported from the south of European (WAGNER 1971), Middle Asia, China, Iraq (KERZHNER & JOSIFOV 1999).

Table 2: Diagnostic taxonomical characters in three species of *Stenodema*.

Taxonomic characters	Ratio/Size (in mm)		
	<i>S. calcarata</i>	<i>S. laevigata</i>	<i>S. turanica</i>
Proportions among antennal segments	1.05: 2.37: 1.25: 0.6	1.27: 2.85: 1.62: 0.87	0.95: 3.45: 1.02: 0.62
Proportions among metatarsomeres	0.55: 0.25: 0.35	0.62: 0.25: 0.32	0.57: 0.35: 0.42
Diatone	0.87-0.95	0.95	1
Synthlipsis	0.42-0.5	0.5	0.5
Ocular index	1.88-2.22	2.22	2
Base of pronotum	1.42-1.57	1.42	1.72
1st antennal segment/ times as long as diatone	1.1-1.2	1.34	0.95
2 nd antennal segment/ times as long as diatone	2.5-2.7	3	3.45
2 nd antennal segment/ times as long as basal width of pronotum	1.5-1.6	2	2
Pronotum/ times as broad basally as long in middle	1.32-1.4	1.18	1.38
Body size	6.7-7.4 ♂ 6.9-7.9 ♀	7.8-8.5 ♂ 8.5-9.1 ♀	7.5 to 8.0 ♂ 7.7-8.5 ♀

Genus *Notostira* FIEBER

Notostira species are elongate grass bugs with a longitudinal furrow between the eyes with very long antennae and legs. The genus is sexually dimorphic; males are black on the upperside, with the margins yellowish-green, while females are much paler. In males, 3 longitudinal lines on head, 4 on pronotum, and 2 on scutellum black or brown; hemelytra pale brownish in inner half and paler on margins. In females dark pattern absent or hardly marked. Head triangular. Slightly wider than the front edge of the pronotum.

Notostira elongata (GEOFFROY 1785) (Fig. 8-5)

M a t e r i a l e x a m i n e d : ARDABIL province: Firuzabad (37°30'56" N, 48°16'01" E, elev. 1484 m), 9.viii.2002; near Khalkhal (37°37'57" N, 48°30'33" E, elev. 1765 m), 9.-11.viii.1998, 8.-9.vii.2002, 29.vii.2004; Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 9.-11.viii.2002, 28.-29.vii.2004.

It has been reported from ALBORZ province: Kordan, 14.vii.2002 (LINNAVUORI 2007)

D i a g n o s i s : Head longer than wide. First article of the antennae considerably more long as the head, the 2nd antennal segment almost two times longer than the first antennal segment, and shorter than III and IV combined (Table 3). Fig. 3A shows a schematic figure of the species. Left paramere (Fig. 4A) hump like sickle, sensory lobe large, with long hair, hypophysis short and thick, slightly curved distally. Right parameres (Fig. 4B) small slender, evenly curved, the apophysis with two points.

C o m m e n t s : In meadows in hills. Two generations has been reported annually for this species in Europe. The Adults overwinter and eggs are laid in spring on grass. The larvae live on grasses. There is a color variation among different seasonal generations (WAGNER & WEBER 1964).

Holopaléarctique species (WAGNER 1971). Recorded from Europe, North Africa and Asia (KERZHNER & JOSIFOV 1999).

Table 3: Diagnostic taxonomical characters in *Notostira elongata*

Taxonomic characters	Ratio/Size (in mm)
Proportions among antennal segments	1.67: 3.5: 2.37: 1.5
Proportions among metatarsomeres	0.75: 0.25: 0.42
Diatone	1.07
Synthlipsis	0.65
Ocular index	3
Base of pronotum	1.62
1 st antennal segment/ times as long as diatone	1.56
2 nd antennal segment/ times as long as diatone	3.27
2 nd antennal segment/ times as long as basal width of pronotum	2.15
Pronotum/ times as broad basally as long in middle	1.4
Body size	6.2-7.6 ♂ 7.7- 8.7 ♀

Only female gender was available for measurements.

***Notostira poppiusi* REUTER 1911 (Fig. 8-6,7)**

M a t e r i a l e x a m i n e d : ARDABIL province: Majareh – Kolar (37°31'46" N, 48°37'42" E, elev. 1919 m), 15.ix.1998.

It has been reported from ZANJAN province: 20-35 km E of Zanjan, 13.vii.2004. TEHRAN province: Kandovan, 2500 m a.s.l., 4 specimens, 3.-4.vii.1995. (LINNAVUORI 2007).

D i a g n o s i s : Male (Fig 3B): Elongate body. Yellowish gray. Head black, base of head pale. Frons prolonged with a basal furrow. Four black longitudinal line on pronotum and 2 on scutellum. Clavus dark. In hind tibia, inner surface hairs are longer than outer surface. Female (Fig. 3C) pale. Specific taxonomical diagnostic characters are shown in Table 4.

C o m m e n t s : In hilly meadows.

Irano-Turanian (LINNAVUORI 2007). Recorded from Azerbaijan, Kazakhstan, Armenia, Turkey, China, Georgia, Kirgizia, Tadjikistan and Turkmenistan (KERZHNER & JOSIFOV 1999).

Table 4: Diagnostic taxonomical characters in *Notostira poppiusi*.

Taxonomic characters	Ratio/Size (in mm)
Proportions among antennal segments	2.12: 3.9: 2.12: 1.12
Proportions among metatarsus	0.87: 0.32: 0.5
Diatone	0.95 ♂ 1.05 ♀
Synthlipsis	0.55 ♂ 0.62 ♀
Ocular index	2.75 ♂ 3.12 ♀
Base of pronotum	1.5 ♂ 1.75 ♀
1st antennal segment/ times as long as diatone	2.23 ♂ 2.02 ♀
2nd antennal segment/ times as long as diatone	4.1 ♂ 3.71 ♀
2nd antennal segment/ times as long as basal width of pronotum	2.6 ♂ 2.22 ♀
Pronotum/ times as broad basally as ling in middle	1.3 ♂ 1.27 ♀
Body size	

Trigonotylus FIEBER

Triangular head, Vertex with a longitudinal furrow, Tylus prominent, forehead slightly above the front, Tylus and lorum so visible from above. Eyes touching the anterior margin of pronotum. Pronotum finely carinate and shield. Tibiae with fine spines and short. Hind femora thicker at the bottom than the top. Antenna and apices of tibiae usually red. Glabrous or with very fine hairs and short. Species of this genus live on grasses.

Key to the species of *Trigonotylus*

- 1 Ventral side with longitudinal red blood stripes. Front, from above, acuminate above the lorum. Posterior angles of pronotum acute. Rear corners the pronotum strongly above *T. pulchellus*
- 1' Ventral side without longitudinal red stripes. Front, seen from above, rounded tip, not exceeding the lorum. Posterior angles of pronotum more rounded..... 2
- 2 Hind tibia 2.5 to 2.65 times longer than the width of the pronotum. Ocular index less than 2.5..... 3
- 2' Hind tibia 2 to 2.2 times longer than the width of the pronotum. Ocular index more than 2.5..... *T. tenuis*
- 3 Aedeagus without spicula. 1st antennal segment with 3 bright red longitudinal stripes. A region covered with small teeth next to the secondary gonopore (Fig. 6I, J).....
..... *T. caelestialium*

Trigonotylus pulchellus (HAHN 1834) (Fig. 8-8)

Material examined: GUILAN province: Asalem (37°41'09" N, 48°49'21" E, 428 m), 2.vii.1996; Ganjeh (36°51'14" N, 49°28'09" E, 212 m), 14.v.-13.vi.1995; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 25.-26.vi.2004; Sang Rud (36°39'59" N, 49°42'06" E, elev. 1338 m), 30.vi.-1.vii.2003. ARDABIL province: Firuzabad (37°30'56" N, 48°16'01" E, elev. 1484 m), 9.viii.2002, 28.vii.2004; Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 9.-11.viii.2002.

It has been reported from ZANJAN province: Mamalan – Abhar, 20.-21.vii.2002; Zanjan, 13.-14.vii.2004. MAZANDARAN province: Chalus, 12.-13.vii.2003. GOLESTAN province: Inche Borun, Alagol, 4.-5.vii.2004; Talulestan, 15.-16.vii.2003. (LINNAVUORI 2007).

D i a g n o s i s : Grayish green, often mixed with pink color. Ventral surface with red stripes on the sides. Antennas blood red, first antennal segment often with two longitudinal yellow or green lines. Dorsum with two bands of reddish brown. Hind tibia 2.5- 2.65 times longer than the width of pronotum (Fig. 5A). Specific taxonomical diagnostic characters are shown in Table 5.

Male genitalia with a strongly curved spicule (Fig. 6C).

C o m m e n t s : On grasses in meadows (LINNAVUORI 2007). *T. pulchellus* lives on grasses and is typically found in sandy areas. Overwinter as egg (WAGNER 1971)

Recorded from Europe, Asia and North Africa (KERZHNER & JOSIFOV 1999). West-Palaeartic (LINNAVUORI 2007).

***Trigonotylus tenuis* REUTER 1893 (Fig. 8-9)**

(Syn.: *T. pallidicornis* REUTER)

M a t e r i a l e x a m i n e d : GUILAN province: Anzali (37°27'44" N, 49°28'16" E, -28 m), 30.viii.-1.ix.1998; Dasht-e-Veel (36°50'48" N, 49°35'32" E, 293 m), 20.-25.viii.1998; Jafrud (37°26'45" N, 49°41'40" E, -22 m), 31.vii.-1.viii.2002; 25 km S of Astara (38°22'51" N, 48°50'33" E, - 22 m), 8.-9.vii.2003; Rasht (37°15'37" N, 49°35'25" E, elev. 1.5 m), vi.-vii.1996, vi.-viii.1998; Sume'eh Sara (37°18'04" N, 49°18'34" E, elev. 2 m), 4.-5.viii.1994. ARDABIL province: Givi (37°40'40" N, 48°28'36" E, elev. 1642 m), 5.vii.2002.

It has been reported from ZANJAN province: Abhar, 12.-14.v.2001. MAZANDARAN province: Chalus, 12.-13.vii.2003; Hassan Abad, 15.-16.vii.2002. GOLESTAN province: Alagol, 12.-13.vii.2003; Gonbad Bakhst-e-Haft, 14.-15.vii.2003; Inche Borun, Alagol, 4.-5.vii.2004. (LINNAVUORI 2007)

D i a g n o s i s : Grayish green or yellowish, often with dorsal longitudinal brownish bands (Fig. 5B). Ventral surface without red stripes. Antennas pale, not red, sometimes brownish. Tarsi often reddish. Narrow shape. Shorter antennae. Hind tibia 2.2 × in males, 2 × in the female longer than the width of pronotum. Male genitalia with a spicule, which is very thin but curved (Fig. 6F). Specific taxonomical diagnostic characters are shown in Table 5.

C o m m e n t s : On grasses in meadows.

Recorded from Europe, Asia and North Africa, Tropical and subtropical regions of the world (KERZHNER & JOSIFOV 1999). Cosmopolitan in warm regions (LINNAVUORI 2007).

***Trigonotylus caelestialium* (KIRKALDY 1902) (Fig. 8-10)**

Material examined: GUILAN province: Asalem (37°41'09" N, 48°49'21" E, 428 m), 2.vii.1996, 5.-7.vii.2003; Gyssom (37°40'17" N, 49°02'46" E, elev. -19 m), 30.vi.-2.vii.1996; Masuleh (37°09'14" N, 48°59'11" E, elev. 1023 m), 6.-26.v.1996; Parudbar (36°36'37" N, 49°44'03" E, 505 m), 29.-30.vii.2003, 25.-26.vi.2004; Rasht (37°15'37" N, 49°35'25" E, elev. 1.5 m), vi.-vii.1996; Rustam Abad – Salan Sar (36°54'36" N, 49°26'20" E, elev. 741 m), 9.-10.viii.2000; Sang Rud (36°39'59" N, 49°42'06" E, 1338 m), 30.vi.-1.vii.2003; Tutkabar – Rudbar (36°53'30" N, 49°31'43" E, elev. 181 m), 22.v.-26.vi.1995. ARDABIL province: Ghareh Ghashlagh (39°19'30" N, 47°55'39" E, elev. 320 m), 27.-28.vii.2004.

It has been reported from ZANJAN province: Jilan Keshe, 9.-13.x.2000; Zanjan, 13.-14.vii.2004. MAZANDARAN province: Chalus, 12.-13.vii.2003; Hassan Abad, 15.-16.vii.2002. GOLESTAN province: Gorgan Mian Dareh, 13.-14.vii.2003; Talulestan, 15.-16.vii.2003. (LINNAVUORI 2007).

Diagnosis: It is similar to *T. ruficornis* and very difficult to separate from it (Fig. 5C). Adeagus without spicule, but next to the secondary gonopore, it can be seen a group of small teeth (Fig. 6 I,J). Specific taxonomical diagnostic characters are shown in Table 5.

Comments: On grasses in meadows. Injurious to cereals.

This species was described by KIRKALDY from central China. It has been recorded in Europe, North Asia, Asia, North America (KERZHNER & JOSIFOV 1999). Palearctic (LINNAVUORI 2007).

Table 5: Diagnostic taxonomical characters in three species of *Trigonotylus*.

Taxonomic characters	Ratio/Size (in mm)		
	<i>T. pulchellus</i>	<i>T. tenuis</i>	<i>T. caelestialium</i>
Proportions among antennal segments	0.87: 2.25: 1.87: 0.67	0.55: 1.75: 1.42: 0.5	0.67: 2.3: 1.82: 0.7
Proportions among metatarsomeres	0.42: 0.17: 0.25	0.32: 0.12: 0.22	0.37: 0.15: 0.22
Diatone	0.75	0.65	0.72
Synthlipsis	0.42	0.37	0.37
Ocular index	2.65	3	2.14
Base of pronotum	1.12	1	0.95
1st antennal segment/ times as long as diatone	1.16	0.84	0.93
2nd antennal segment/ times as long as diatone	3	2.69	3.17
2nd antennal segment/ times as long as basal width of pronotum	2	1.75	2.42
Pronotum/ times as broad basally as long in middle	1.7	2	1.52
Body size	4.2-4.5 ♂ 4.6-4.65 ♀	3.8-4.35 ♂ 4.5-5.1 ♀	4.8-5.3 ♂ 5.3-6.3 ♀

Genus *Megaloceroea* FIEBER

Very long antennae and legs, in apex, longitudinal furrow. Short setae on antennal segment I and II. Scutellum fine keel. Legs almost cylindrical.

***Megaloceroea recticornis* (GEOFFROY 1785) (Fig. 8-11)**

Material examined: GUILAN province: Masal forest (37°21'16" N, 49°08'46" E, elev. 44 m), 28.vi.1996, Dylaman (36°53'05" N, 49°54'26" E, elev. 141 m), 20.vii.1996.

Diagnosis: Color of adults varies from straw-yellow to green, but the nymphs are green with two brown bands on the thorax. Species is an elongate grass bug with a longitudinal furrow between the eyes, this species is distinguished by the extremely long antennae and very long, slender hind legs (Fig. 7A). Bright Green, gray or whitish membrane. The forehead not exceed the top of Tylus. The second antennal segment almost as long as the 3rd and more than 3 times longer than the IV segment. Pronotum punctuated. Article III of the tarsi black. Distinguished by the vestiture of antennal segment I short. Dorsal surface smooth or smoothly rugulose, appearing glabrous, but with minute vestiture. Male genitalia with ventrally thickened secondary gonopore (Figs. 7). Specific taxonomical diagnostic characters are shown in Table 6.

Comments: A widespread and common species of grasslands, uncut meadows and woodland borders. This species lives on grasses in the mountains, especially slopes and forest edges undergrowth in deciduous forests (LINNAVUORI 2007).

Recorded from throughout of Europe, Asia, North Africa, extended to North America and New Zealand (KERZHNER & JOSIFOV 1999). Holarctic (LINNAVUORI 2007).

Table 6: Diagnostic taxonomical characters in *Megaloceroea recticornis*

Taxonomic characters	Ratio/Size (in mm)
Proportions among antennal segments	2: 4.4: 4.15: 1
Proportions among metatarsomeres	0.67: 0.25: 0.37
Diatone	1
Synthlipsis	0.55
Ocular index	2.44
Base of pronotum	1.4
1st antennal segment/ times as long as diatone	2
2nd antennal segment/ times as long as diatone	4.4
2nd antennal segment/ times as long as basal width of pronotum	3.14
Pronotum/ times as broad basally as ling in middle	1.36
Body size	8.0-8.5 ♂
	9-10 ♀

Discussion

Most of examined specimens were collected from meadows or natural habitats on wild host plants. No attempt was made to investigate these species in the wheat, barley or alfalfa fields nearby of the collection sites. Therefore in future it is necessary to survey in these fields to elucidate the possibility of presence of studied species and subsequently their economic importance. Among collected specimens, 3 species of *Stenodema* were considered much abundant than others. It is useful to find out the ecological rule of collected species in their ecosystem, this can help to have a better understanding of their biological importance in the nature or artificial habitats.

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Author's address:

Reza HOSSEINI

Department of Plant Protection, College of Agricultural Sciences,

University of Guilan, Rasht, Iran

E-mail: Rhosseini@guilan.ac.ir, R_hosseini@yahoo.com

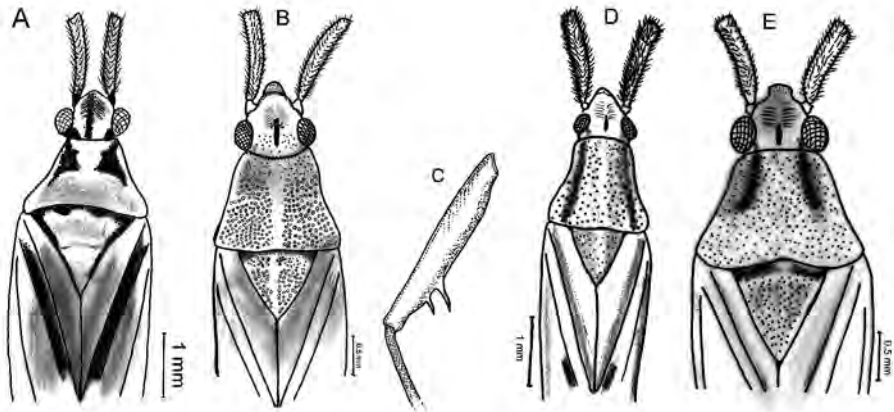


Fig 1: (A) *Leptopterna putshkovi*; (B, C) *Stenodema calcarata*; (D) *Stenodema laevigata*; (E) *Stenodema turanica*; (C) hind leg.

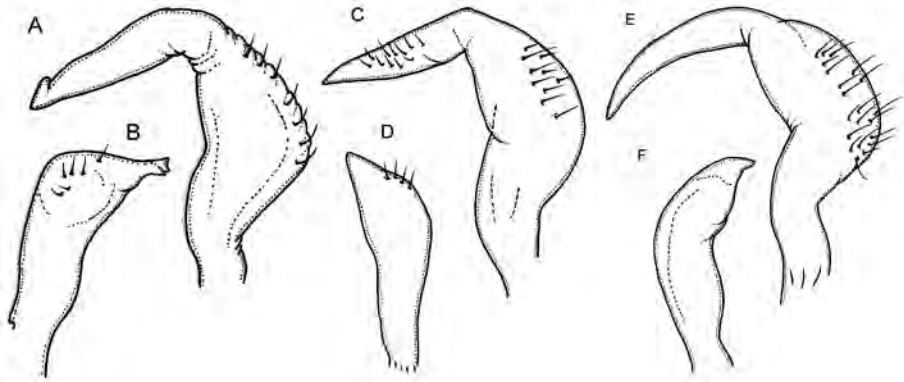


Fig 2: Parameres of male genitalia: (A, B) *Stenodema calcarata*; (C, D) *Stenodema laevigata*; (E, F) *Stenodema turanica*; (A, C, E) left paramere; (B, D, F) right paramere.

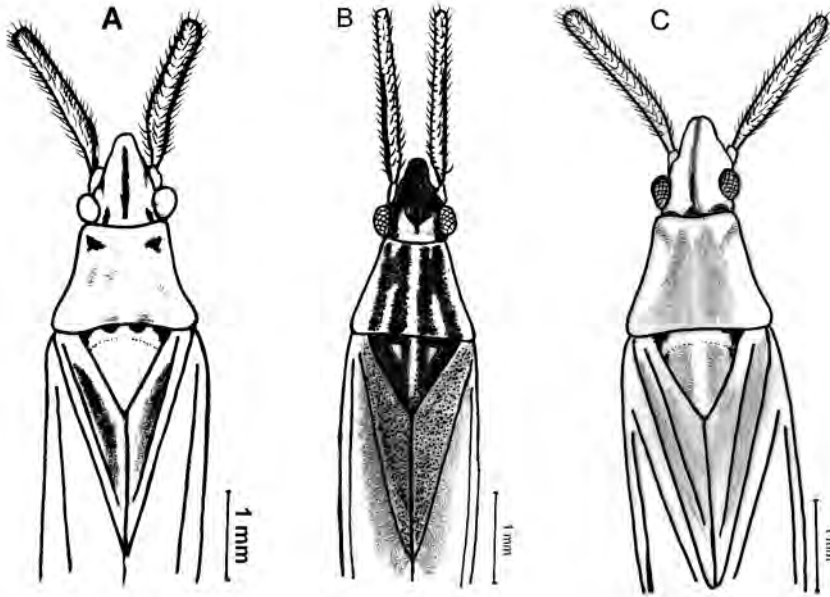


Fig. 3: (A): *Notostira elongate*; (B) (♂); (C) (♀) *Notostira poppiusi*.

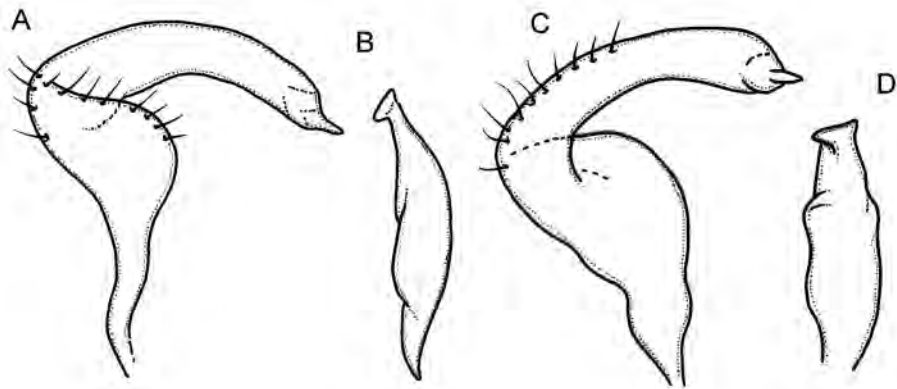


Fig. 4: Parameres of male genitalia: (A, B) *Notostira elongate*; (C, D) *Notostira poppiusi*. (A, C) left paramere; (B, D) right paramere.

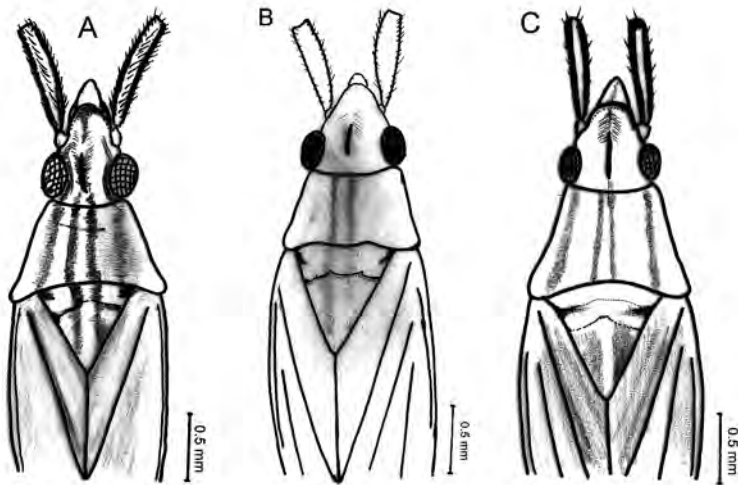


Fig. 5: (A) *Trigonotylus pulchellus*; (B) *Trigonotylus tenuis*; (C) *Trigonotylus caelestialium*.

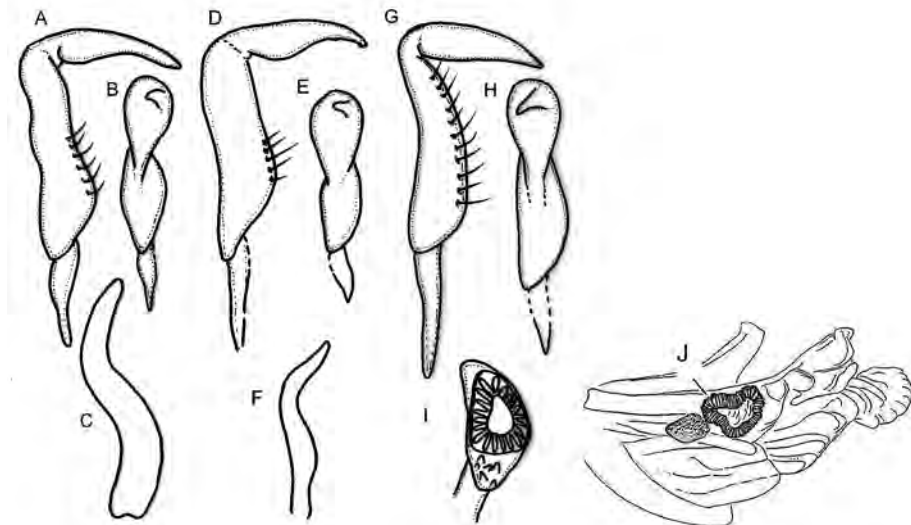


Fig. 6: Parameres of male genitalia: (A-C) *Trigonotylus pulchellus*; (D-F) *Trigonotylus tenuis*; (G-J) *Trigonotylus caelestialium*, (J) secondary gonopore and a region covered with small teeth next to it in Vesica (After WAGNER 1971, SCHWARTZ 2008).

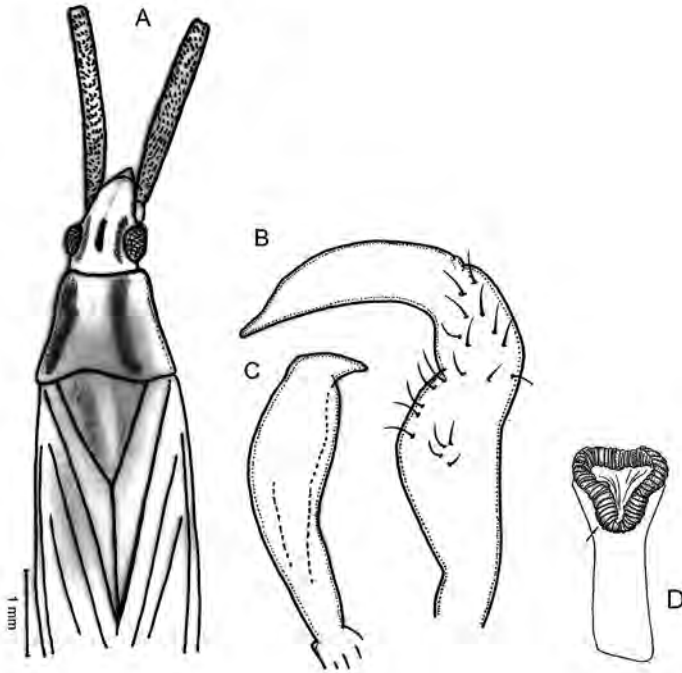


Fig. 7: (A) *Megaloceroea recticornis*; (B, C) left and right parameres (Original), (D) Secondary gonopore (After SCHWARTZ 2008).

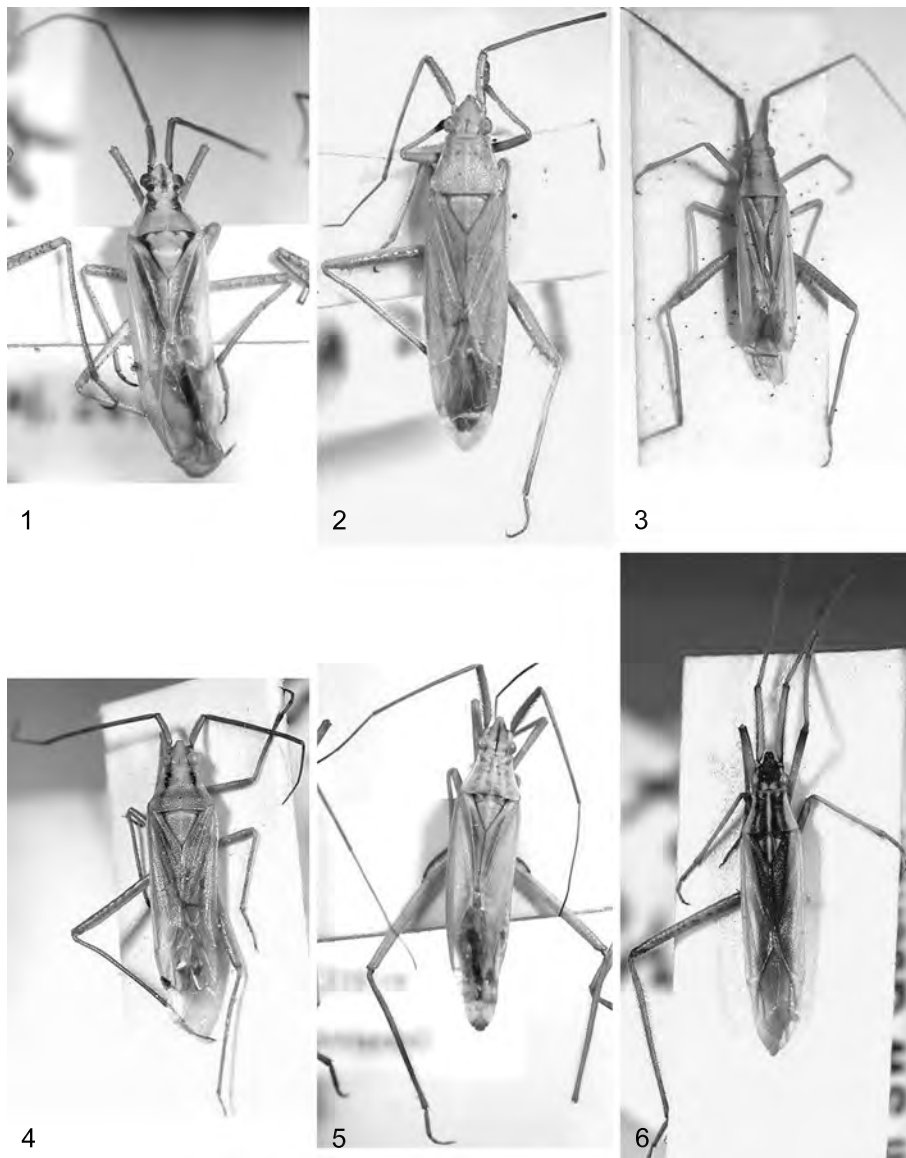


Fig. 8 (1-6): (1) *Leptopterna putshkovi*; (2) *Stenodema (Brachystira) calcarata*; (3) *Stenodema (Stenodema) laevigata*; (4) *Stenodema (Stenodema) turanica*; (5) *Notostira elongate*; (6) *Notostira poppiusi* (♂);

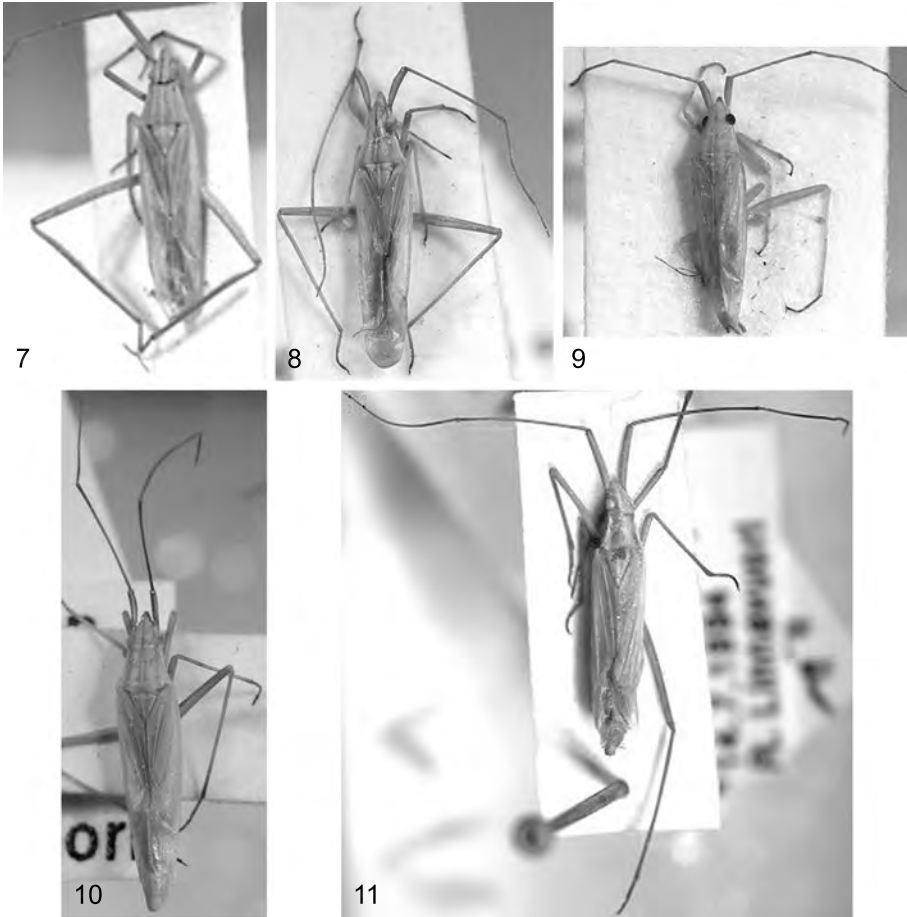


Fig. 8 (7-11): (7) *Notostira poppiusi* (♀); (8) *Trigonotylus pulchellus*; (9) *Trigonotylus tenuis*; (10) *Trigonotylus caestialium*; (11) *Megaloceroea recticornis*.

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Fritz GUSENLEITNER, Lungitzerstr. 51, A-4222 St. Georgen/Gusen;
Wolfgang SPEIDEL, MWM, Tengstraße 33, D-80796 München;
Thomas WITT, Tengstraße 33, D-80796 München.

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