

## Leafhoppers of the subtribe *Paradorydiina* Evans (Hemiptera, Auchenorrhyncha: Cicadellidae) in the United Arab Emirates

## Цикадки подтрибы *Paradorydiina* Evans (Hemiptera, Auchenorrhyncha: Cicadellidae) в Объединенных Арабских Эмиратах

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**Abstract.** *Chloropelix canariensis* Lindberg, 1936, *Paradorydium desertorum* Linnavuori, 1964, and *P. spatulatum* (Naudé, 1926) are recorded from the United Arab Emirates for the first time. These species were collected from Poaceae and Compositae in northeastern part of the country. *Paradorydium desertorum* is also recorded for the first time from Israel, and *P. spatulatum*, from Morocco. Two new synonyms are established: *Bumizana deccani* Viraktamath et Viraktamath, 1989, **syn. nov.** = *P. spatulatum*; *Chloropelix indica* Viraktamath et Viraktamath, 1989, **syn. nov.** = *Ch. canariensis*.

**Резюме.** *Chloropelix canariensis* Lindberg, 1936, *Paradorydium desertorum* Linnavuori, 1964 и *P. spatulatum* (Naudé, 1926) впервые указаны из Объединенных Арабских Эмиратов. Эти виды собраны со злаков (Poaceae) и сложноцветных (Compositae) на северо-востоке страны. *Paradorydium desertorum* также впервые указан из Израиля, а *P. spatulatum* – из Марокко. Установлены два новых синонима: *Bumizana deccani* Viraktamath et Viraktamath, 1989, **syn. nov.** = *P. spatulatum*; *Chloropelix indica* Viraktamath et Viraktamath, 1989, **syn. nov.** = *Ch. canariensis*.

**Key words:** leafhoppers, systematics, phaunistics, Palearctic Region, Hemiptera, Cicadellidae, Deltoccephalinae, Eupilicini, *Paradorydiina*, new records, new synonyms

**Ключевые слова:** цикадки, систематика, фаунистика, Палеарктическая область, Hemiptera, Cicadellidae, Deltoccephalinae, Eupilicini, *Paradorydiina*, новые указания, новые синонимы

**ZooBank Article LSID:** urn:lsid:zoobank.org:pub:479AC6D4-A871-4B8B-BCD3-BB4E19EF7D1D

### Introduction

Fauna of Cicadellidae of the United Arab Emirates is still in its initial stage of discovery. Many specimens from this family were collected during the project targeting the Arthropod fauna of the UAE directed by Dr. Antonios van Harten (Almada, Portugal), but the identification of those samples is still ongoing. Recently, Wilson and Turner (2010) provided a key to Auchenorrhyncha families of the Arabian Peninsula and in frame of this project formally reported three cicadellid

genera for the country (*Balclutha* Kirkaldy, 1900; *Austroagallia* Evans, 1935; *Exitianus* Ball, 1929) illustrated on a photo plate. The only known cicadellid species, *Macropsis latiliorata* Tishechkin, 2017, which has the type locality in the UAE (Wadi Wurayah National Park), was recently described by Tishechkin (2017).

During my field trips to the UAE undertaken in April 2010 and in March and December 2017 under the assistance of Dr. Antonios van Harten and Dr. Vladimir M. Korshunov (Fujairah, UAE), three cicadellid species, namely *Chloropelix ca-*

*nariensis* Lindberg, 1936, *Paradorydium desertorum* Linnavuori, 1964 and *P. spatulatum* (Naudé, 1926), were collected by sweeping on *Aristida* cf. *abnormis* Chiov. and *Sporobolus* sp. (Poaceae) as well as on *Rhanterium epapposum* Oliv. (Compositae) in several localities of the northeast UAE.

Both genera, *Chloropelix* Lindberg, 1936 and *Paradorydium* Kirkaldy, 1901, belong to the subtribe *Paradorydiina* Evans, 1936 of the deltocephaline tribe *Eupelicini* Sahlberg, 1871. The subtribe comprises six genera with more than 60 species distributed throughout the Old World (Zahniser & Dietrich, 2013). In the Arabian Peninsula, *Paradorydiina* was recorded already from the Saudi Arabia and Yemen (Linnavuori, 1979; Dlabola, 1979), but was not known from the north of Peninsula. New records for *Ch. canariensis*, *P. desertorum*, and *P. spatulatum* from the northeast part of Arabian Peninsula are provided below; the two latter species are also reported from Morocco and Israel.

## Material and methods

The taxonomy of the subfamily Deltocephalinae follows Zahniser & Dietrich (2013). The drawings were made using a Leica MZ9.5 light microscope with a camera lucida attached. The photos were taken using the same microscope with a Leica DFC 290 camera. Images were edited using the Helicon Focus and Adobe Photoshop software.

The series of the species listed below are deposited in the Zoological Institute of the Russian Academy of Sciences, St Petersburg.

## Systematics

Family **Cicadellidae** Latreille, 1802

Subfamily **Deltocephalinae** Dallas, 1870

Tribe **Eupelicini** Sahlberg, 1871

Subtribe **Paradorydiina** Evans, 1936

Genus ***Chloropelix*** Lindberg, 1936

***Chloropelix canariensis*** Lindberg, 1936  
(Figs 1–4)

*Chloropelix canariensis* Lindberg, 1936: 4, fig. 1 a–d.

*Chloropelix indica* Viraktamath & Viraktamath, 1989: 26, figs 33–46, **syn. nov.**

**Material studied.** **Spain:** 1 ♂, Canary Islands, Tenerife, Puerto de la Cruz, 2–4.II.1949, H. Lindberg leg. **United Arab Emirates:** 1 ♀, *Fujairah*, Wadi Hayl, N 25°04.896', E 56°13.525', 262 m, 11.IV.2010; 1 ♂, *Fujairah*, Wadi Madaq, N 25°20.660', E 56°05.890', 443 m, rocks, 6.IV.2010; 3 ♂, *Fujairah*, 8 km NW Khor Fakkan, Wadi Wurayah National Park, N 25°23.366', E 56°18.356', 165 m, 22.III.2017, swept on *Aristida* cf. *abnormis*; 1 ♂, *Fujairah*, near Dadna, N 25°24.018', E 56°17.475', 26.III.2017; 7 ♂, 18 ♀, 3 larvae, *Fujairah*, Al Bidya, 12.XII.2017, swept on *Sporobolus* sp.; 1 ♀, *Sharjah*, Kalba, N 25°09.230', E 56°21.560', 11.IV.2010, mangroves saline; 1 ♂, 1 ♀, 2 larvae, *Abu Dhabi*, near Al Ain, Wadi Tarabat, 400 m, N 24°05.186', E 55°46.570', 12.IV.2010. All specimens from UAE collected by V.M. Gnezdilov.

**Notes.** The genus *Chloropelix* was erected by H. Lindberg (1936) for a single species, *Ch. canariensis*, described from Tenerife Island (Lindberg, 1936) and later recorded also from La Gomera Island of the Canary Islands (Lindberg, 1954). Currently, *Ch. canariensis* is known from the Canary Islands, Cape Verde and Madeira via southern Spain, Western Sahara, northern and southern Africa to Israel, Saudi Arabia and southern Yemen (D'Urso et al., 2019). Later, one more species, *Ch. indica* Viraktamath et Viraktamath, 1989, was described from Rajasthan State of northern India and Sindh Province of southern Pakistan (Viraktamath & Viraktamath, 1989).

Examination of UAE specimens of *Ch. canariensis* and comparison of the structure of the male genitalia with the descriptions and drawings published by Lindberg (1936, 1954), Viraktamath and Viraktamath (1989), and D'Urso et al. (2019) revealed that *Ch. indica* Viraktamath et Viraktamath, 1989 should be treated as a junior synonym of *Ch. canariensis* Lindberg, 1936. Viraktamath and Viraktamath (1989) when describing *Ch. indica* referred to the structural details of the aedeagal apex of *Ch. canariensis* given by Lindberg (1954) when he redescribed the species, in particular, two spiny processes at the apex of the aedeagal shaft (Lindberg, 1954: fig. e) which are absent in *Ch. indica* (Viraktamath & Viraktamath, 1989: fig. 44). Photos of the holotype of *Ch. indica* with the external view of the specimen and male genitalia parts were kindly sent to me for study by Dr. Chandrashekhara swamy A. Viraktamath (Bangalore, India). Taking into account that Lindberg (1936: fig. 1 a–d), when he first described *Ch. ca-*



**Figs 1–4.** *Chloropelix canariensis* Lindberg, 1936, dorsal view: **1**, male, Wadi Wurayah; **2**, male, Wadi Wurayah; **3**, female, Al Bidya; **4**, 5th instar larva, Al Ain. Total body length: male – 2.5 mm; female – 3.0 mm; larva – 2.5 mm.

*nariensis*, did not mention these processes, nor did D’Urso et al. (2019), and no processes are visible on the specimens from Tenerife and the UAE examined by me, I suspect that the tiny walls around the gonopore at the apex of the aedeagal shaft of *Ch. canariensis* were misinterpreted as a

pair of short spiny lateral processes appressed to the sides of the aedeagus, which is an optical effect. In fact, those “processes” are only the walls of the aedeagus. Other characters, such as shape of the head (see different shape of anterior margin of head in two males from the same sample in

Wadi Wurayah; Figs 1–2) and shape of the genital plates, are almost the same in both taxa. Some slight differences may be treated as interspecific variability or a different drawing style. Based on available evidence, I propose to treat these two names as synonyms and extend the distribution of *Ch. canariensis* all the way to the Indian subcontinent.

*Pennisetum setaceum* (Forssk.) Chiov. and *Cenchrus ciliaris* L. (= *P. cenchroides* Rich.) (Poaceae) were recorded as host plants of *Ch. canariensis* by D'Urso et al. (2019) and Lindberg (1954). Viraktamath and Viraktamath (1989) recorded *Ch. indica* associated with *Crotalaria burhia* Buh.-Ham. (Fabaceae).

Genus **Paradorydium** Kirkaldy, 1901

***Paradorydium spatulatum*** (Naudé, 1926)  
(Figs 5–9)

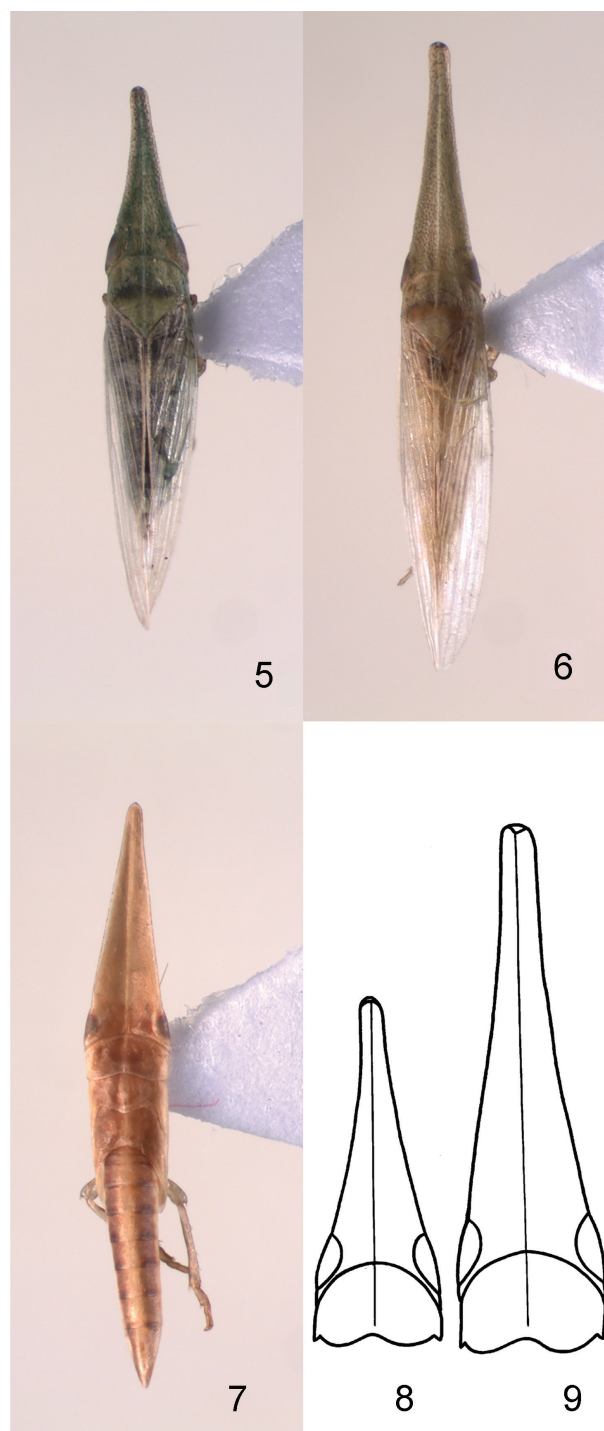
*Dorydium spatulatum* Naudé, 1926: 33.

*Paradorydium occidentale* Lindberg, 1954: 208, Abb. 51 l–m, syn. fide Theron, 1976: 250.

*Bumizana deccani* Viraktamath & Viraktamath, 1989: 20, figs 1–14, **syn. nov.**

**Material studied. United Arab Emirates:** 2 ♂, *Fujairah*, Wadi Madaq, N 25°20.660', E 56°05.890', 443 m, rocks, 6.IV.2010; 5 ♂, 1 larva, *Fujairah*, mountain valley near motor tunnel, N 24°58.840', E 56°10.121', 11.IV.2010, swept on *Rhanterium epapposum* Oliv.; 10 ♂, 10 ♀, 1 larva, *Fujairah*, 8 km NW Khor Fakkan, Wadi Wurayah National Park, N 25°23.366', E 56°18.356', 165 m, 20–25.III.2017, swept on *Aristida* cf. *abnormis*; 1 ♂, *Fujairah*, near Dadna, N 25°24.018', E 56°17.475', 26.III.2017; 1 ♂, *Ras al Khaimah*, Jebel Jibir, N 25°38.225', E 56°06.885', 1272 m, 8.IV.2010; 1 ♂, *Sharjah*, Sharjah Desert Park, N 25°16.859', E 55°41.422', 10.IV.2010. All specimens from UAE collected by V.M. Gnezdilov. **Morocco:** 5 ♀, near Inraren Village, N 30°33'09.3", W 9°33'00.2", 8–9.VI.2015, on grass, D.A. Gapon leg.

**Notes.** *Paradorydium spatulatum* (Naudé, 1926) was described from Southern Africa. Taking into consideration the synonymy with *P. occidentale* Lindberg, 1954 established by Theron (1976), it is currently known also from the Canary Islands, Sudan, and Turkey (Naudé, 1926; Lindberg, 1954; Theron, 1976; Demir, 2005). Long-headed species of the genus *Paradorydium* Kirkaldy, 1901, even those with a similar shaped head process, are readily recognizable by the struc-



**Figs 5–9.** *Paradorydium spatulatum* (Naudé, 1926), dorsal view, Wadi Wurayah: **5**, male; **6**, female, **7**, 5th instar larva; **8**, male, head and pronotum; **9**, female, head and pronotum. Total body length: male – 4.2 mm; female – 5.5 mm; larva – 4.5 mm. Length of the head + pronotum: male – 1.8 mm; female – 2.7 mm.



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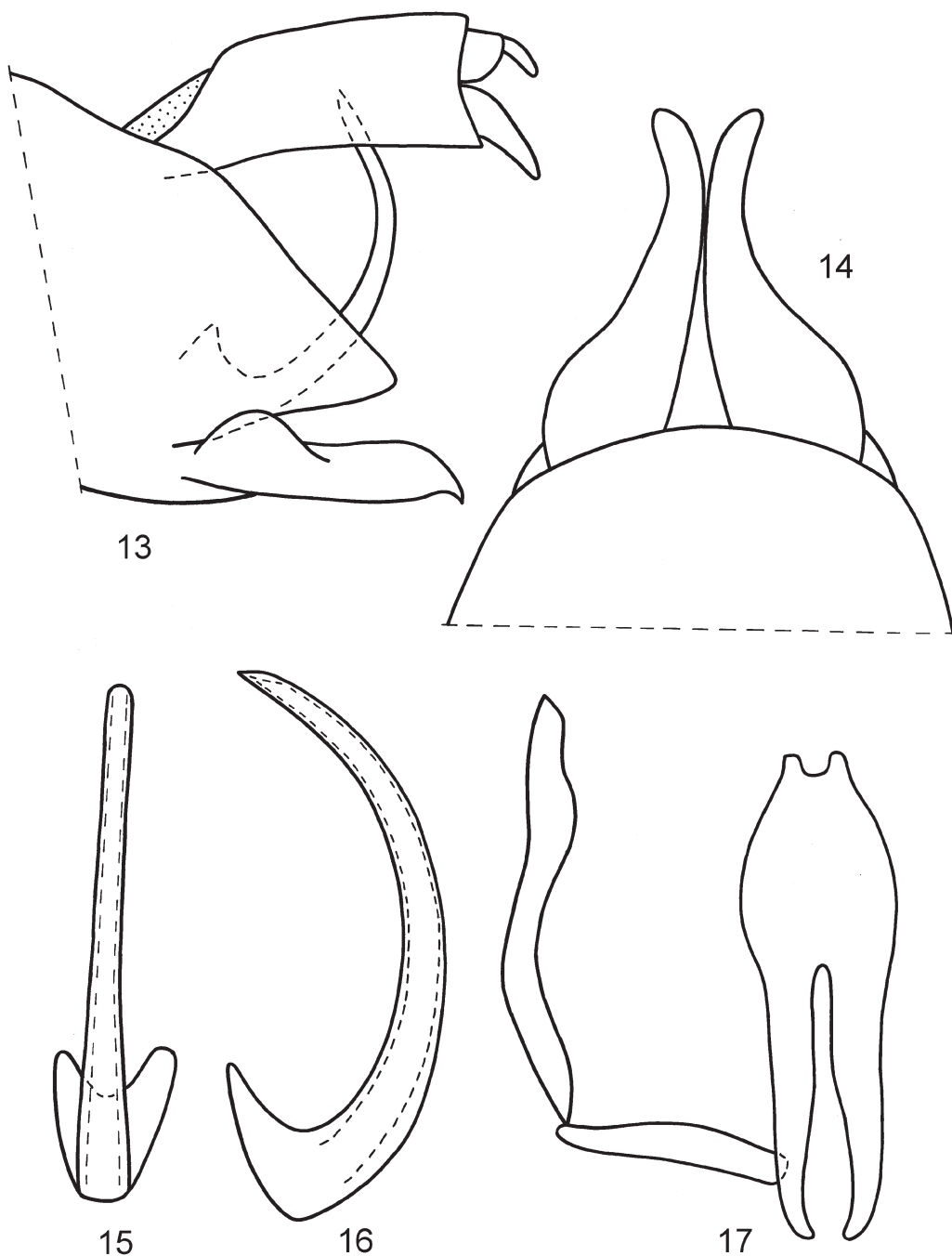


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**Figs 10–12.** *Paradorydium desertorum* Linnavuori, 1964: **10**, male, dorsal view, Beer Sheva; **11**, female, dorsal view, Al Ajban; **12**, female, face. Total body length: male – 3.0 mm; female – 3.8 mm.

ture of the male genitalia, particularly the shape of the pygofer apex and aedeagus (Ribaut, 1952; Theron, 1976; Demir, 2005). Thus, *P. spatulatum* (Naudé, 1926) has the pygofer apex angularly convex, the aedeagus without processes, and the aedeagal shaft slightly curved (Lindberg, 1954:

fig. 51 l–m). Based on this, I follow the synonymy of *Paradorydium spatulatum* (Naudé, 1926) and *Paradorydium occidentale* Lindberg, 1954 established by Theron (1976) who illustrated the male genitalia of Naudé's types (Theron, 1976: figs. 26, 28, 29). My examination of the original descrip-



**Figs 13–17.** *Paradorydium desertorum* Linnavuori, 1964, male genitalia: **13**, genital block, lateral view; **14**, genital valve and genital plates, ventral view; **15**, aedeagus, ventral view; **16**, aedeagus, lateral view; **17**, connective and style, ventral view.

tion of *Bumizana deccani* Viraktamath et Viraktamath, 1989 from western India (Karnataka, Gujarat, and Rajasthan States) (Viraktamath & Viraktamath, 1989: figs 1–14) as well as the photos of the holotype of this species with the external view of the specimen and the male genitalia parts, received from Dr. C. Viraktamath, revealed high similarity in the shape and length of the head

as well as in the structure of male genitalia of this species and *P. spatulatum* (Naudé, 1926). Taking into account all evidence, I suggest to place these names into synonymy.

Lindberg (1958) recorded *P. occidentale* as associated with *Aristida paradoxa* Willd. ex Kunth. (currently *Aristida dichotoma* Michx.) in Cape Verde.

***Paradorydium desertorum*** Linnavuori, 1964  
(Figs 10–17)

*Paradorydium desertorum* Linnavuori, 1964: 339, fig. 24b.

**Material studied. United Arab Emirates:** 3 ♀, Abu Dhabi, Al Ajban, N 24°36', E 55°01', 17.IV.2010, V.M. Gnezdilov leg. **Israel:** 1 ♂, 2 ♀, Beer Sheva, 30.V.1966, V.A. Tryapitsyn leg.

**Notes.** The species was described from several females from “Cairo-Suez desert road” in Egypt collected on *Panicum turgidum* Forssk. (Linnavuori, 1964). Fifteen years later it was also recorded from south of Riyadh in Saudi Arabia based on a single female (Dlabola, 1979). For the first time, *P. desertorum* male genitalia are described and illustrated here based on a specimen from the Negev desert in Southern Israel.

**Male genitalia** (Figs 13–17). Anal tube long. Hind margin of pygofer lobe triangular, short, more or less evenly sloping posteroventrad from base to apex, without posterodorsal process (Fig. 13). Hind margin of genital valve weakly convex (Fig. 14). Genital plates narrowing apically, with pointed apices (Figs 13, 14). Aedeagal shaft narrow, slightly and gradually tapered from base to apex in both lateral and posterior view, arcuately bent, without processes (Figs 15, 16). Connective elongate. Style narrow; apex obliquely tapered (Fig. 17).

## Discussion

*Paradorydium sefrense* (Puton, 1898), described from a female collected in Aïn-Sefra (northwest Algeria), belongs to the long-headed group of *Paradorydium* species, but it differs from *P. spatulatum* by the short forewings which do not cover the genital segments (Puton, 1898). The record of *P. paradoxum* (Herrich-Schäffer, 1837) from southeastern Iran (Mozaffarian & Wilson, 2016) needs further confirmation by examination of its male genitalia because this species was originally described from Bavaria (Nürnberg) in Germany (Herrich-Schäffer, 1837) and could be confused with *P. spatulatum* based on the shape of the long head only.

One of the host plants of *Ch. canariensis* and *P. spatulatum* in the UAE belongs to the genus *Aristida* L. which is a cosmopolitan genus of Po-

aceae comprising ~300 species. The representatives of *Aristida* are important components of grasslands, deserts, deciduous forests, oak-pine forests, semiarid, arid, and waste areas of the tropics and subtropics (Cerros-Tlatilpa et al., 2011). In Wadi Wurayah National Park, both species were collected on *Aristida* cf. *abnormis* Chiov. in the area near to the houses of park workers; in Al-Bidya, *Ch. canariensis* was swept on *Sporobolus* sp. near a motor road. In Spain, *Ch. canariensis* was recorded as associated with *Cenchrus setaceus* (Forssk.) Morrone which is a highly invasive grass species (D’Urso et al., 2019). Thus, the wide range of distribution of *Ch. canariensis* and *P. spatulatum*, both associated with Poaceae, may be explained not only by native distribution but also as a result of an anthropogenic impact.

## Acknowledgements

I am glad to thank Dr. Antonios van Harten (Almada, Portugal) and Dr. Vladimir M. Korshunov (Fujairah, UAE) for providing my field work, Dr. Dmitry A. Dmitriev (Champaign, Illinois, USA) for his help with literature, Dr. Chandrashekhara swamy A. Viraktamath (Bangalore, India) and Dr. Vera D’Urso (Catania, Italy) for valuable discussion and providing me with the materials for study, Dr. Vyacheslav V. Byalt (Saint Petersburg, Russia) for his identification of Poaceae, Dr. Christopher H. Dietrich (Champaign, Illinois, USA) for his valuable review of the manuscript, and Prof. Vladimir A. Tryapitsyn (Moscow, Russia) and Dr. Dmitry A. Gapon (St Petersburg, Russia) for providing with material. The study was performed in the framework of the Russian State Research Project № AAAA-A19-119020690101-6.

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Received 2 April 2019 / Accepted 21 May 2019. Scientific editor: D.A. Dmitriev