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## NEW DATA ON TWO RARE SPECIES OF *FANNIA* (DIPTERA, FANNIIDAE)

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**Abstract.** Two new synonymies are proposed: *Fannia fasciculata* Loew, 1873 = *F. baihualingensis* Yan, Xu, Wang & Zhang, 2019, *syn. nov.*; *Fannia xiaoi* Fan, 2000 = *F. fani* Wang & Wu, 2017, *syn. nov.* *F. fasciculata* is supposed to be originated from S-E Palaearctic, though it was described from Europe. Specimens previously identified as *F. fani* are regarded as a case of intersex males of *F. xiaoi*. Taxonomy and distribution of both considered species are discussed and specified. *F. fasciculata* and *F. xiaoi* were newly recorded for Russia.

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**Keywords:** Diptera, Fanniidae, *Fannia fasciculata*, *Fannia xiaoi*, new records, synonymies.

## НОВЫЕ ДАННЫЕ ПО ДВУМ РЕДКИМ ВИДАМ *FANNIA* (DIPTERA, FANNIIDAE)

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**Аннотация.** Предложены два новых синонима: *Fannia fasciculata* Loew, 1873 = *F. baihualingensis* Yan, Xu, Wang & Zhang, 2019, *syn. nov.*; *Fannia xiaoi* Fan, 2000 = *F. fani* Wang & Wu, 2017, *syn. nov.* Высказано предположение, что *F. fasciculata* происходит из юго-восточной Палеарктики, хотя описана была из Европы. Экземпляры, ранее определявшиеся как *F. fani*, рассматриваются как случай интерсексуальных самцов *F. xiaoi*. Обсуждены и уточнены таксономия и распространение обоих рассмотренных видов. *F. fasciculata* и *F. xiaoi* впервые приведены для России.

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**Ключевые слова:** Diptera, Fanniidae, *Fannia fasciculata*, *Fannia xiaoi*, новые находки, синонимы.

## INTRODUCTION

The genus *Fannia* (Robineau-Desvoidy, 1830) is large and taxonomically difficult. Most species of *Fannia* are rather similar blackish flies, often the reliable identification of them requires examination of male genitalia. In several cases the differences in male genitalia proposed as diagnostic ones are minute and doubtful. No wonder that under those circumstances quite many species of *Fannia* are poorly known or known only by their type(s) and original description. However, *Fannia fasciculata* Loew, 1873 and *Fannia xiaoi* Fan, 2000, considered in present paper, are different cases, because males of these species are unmistakable due to a modified  $f_3$  (with a tubercle near the apex covered with long ventral setae); characteristic genitalia and several other characters. It is difficult to imagine that specimens of such remarkable species have been overlooked in entomological collections so they appear to be really rare species. Fortunately, both species were newly found in Russia, the specimens are stored in the collection of Zoological Museum of Moscow University. New data on their taxonomy and distribution are outlined in this paper.

### *Fannia fasciculata* Loew, 1873

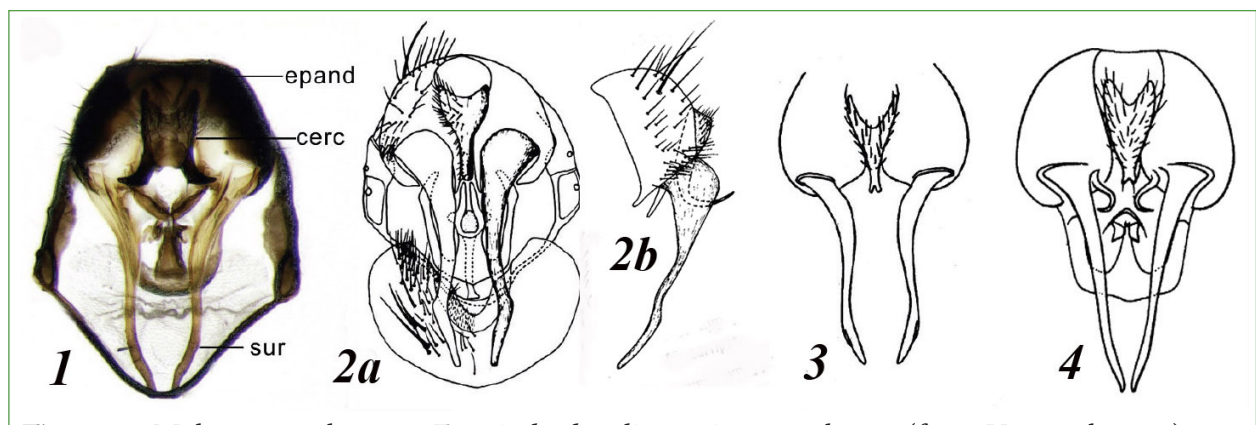
*Fannia baihualingensis* Yan, Xu, Wang & Zhang, 2019, **syn. nov.**

Figs 1, 3–8

**Taxonomic notes.** *Fannia fasciculata* cannot be confused: abdominal tergites (at least 3 and 4) yellow with contrasting median vitta formed by black triangles;  $f_3$  strongly curved; near apex it has a tubercle with about 20 long (twice as long as femur width) ventral setae (Figs 5–6);  $t_2$  widened in basal 1/3 and apical half, both widened parts covered with ventral hairs (Fig. 7);  $tar2-1$  (for this abbreviation see Vikhrev 2011, 60) projected and flattened ventrally; coxa bare at inner posterior margin; lower calypter projecting; genitalia characteristic: surstyli very long and slender, cercal plate small, bifurcate at apex (see Figs 1, 3, 4).

*F. fasciculata* was described from Baile Herculane (44.88°N 22.41°E), Romania. Since that time only two more records were known: Czechia (Rozkosny et al. 1997) and Croatia (Pont 2013), the female of *F. fasciculata* is still unknown.

Recently, a new species *Fannia baihualingensis* Yan, Xu, Wang & Zhang, 2019 was described from China, Yunnan prov., Gaoligong, Baihualing [more detail coordinates are 25.3°N 98.8°E, but the range of possible altitudes is very wide, from 700 to 3100 m asl], 25.07.2015, L.P. Yan & C. Wang, ♂ Holotype and 2♂ paratypes (Museum of Beijing Forestry University, China) (Yan et al. 2019). I do not agree with the authors that it is a new species, I believe that we face just a new record of *F. fasciculata*.



**Figs 1–4.** Male terminalia: 1 — *Fannia baihualingensis*, ventral view (from Yan et al. 2019); 2 — *F. curvipes*, ventral (2a) and lateral (2b) views (from Chillcott 1961); 3 — *F. fasciculata*, ventral view (from Hennig 1955); 4 — *F. fasciculata*, ventral view (from Rozkosny et al. 1997)

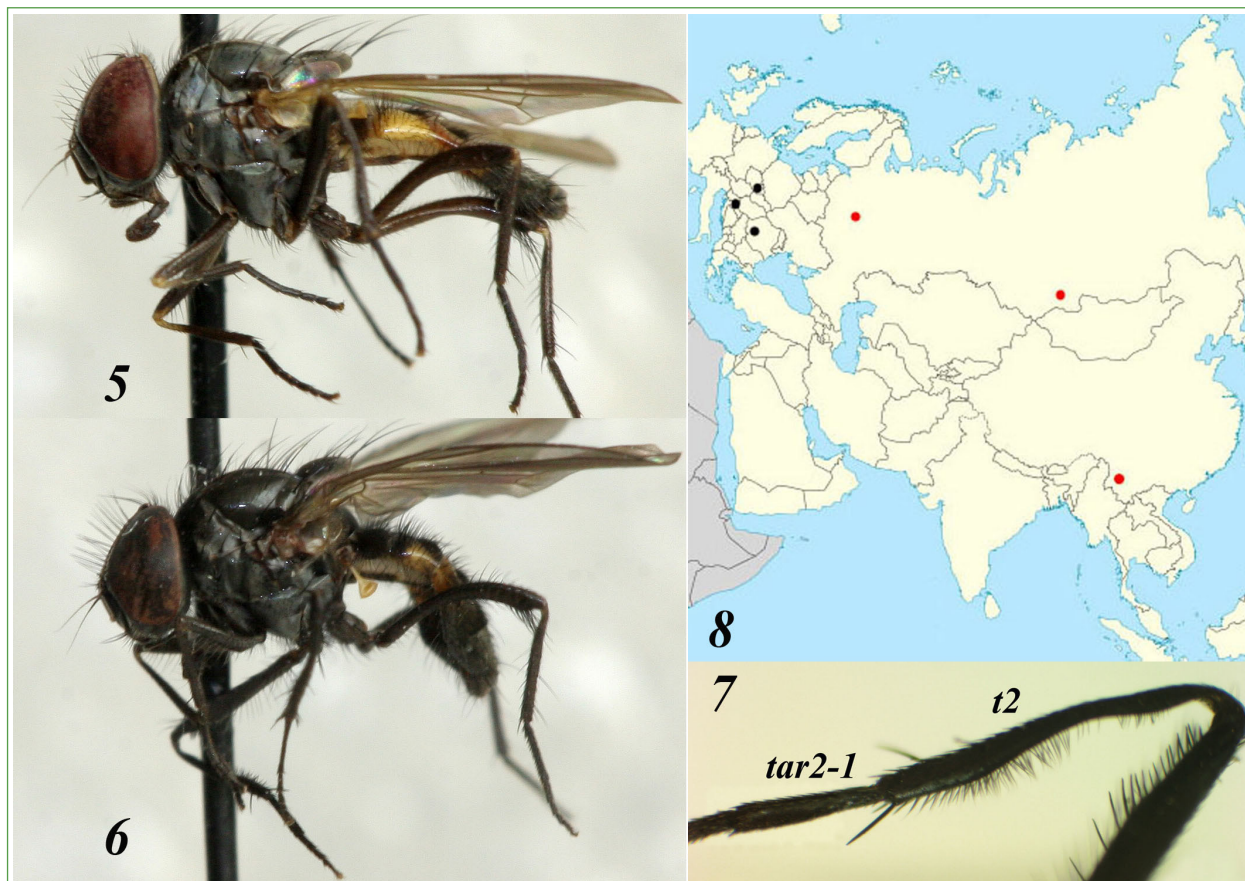
**Рис. 1–4.** Гениталии самца: 1 — *Fannia baihualingensis*, вентрально (из Yan et al. 2019); 2 — *F. curvipes*, вентрально (2a) и латерально (2b) (из Chillcott 1961); 3 — *F. fasciculata*, вентрально (из Hennig 1955); 4 — *F. fasciculata*, вентрально (из Rozkosny et al. 1997)

**Synonymy.** Yan et al. (2019) compared *F. baihualingensis* with similar *F. curvipes* Malloch, 1924 (Nearctic species) and *F. fasciculata*. Let us regard their results. Yan et al. (2019) describe the terminalia of their species (Fig. 1) as follows: “cercus of *F. baihualingensis* is slightly rounded, with the hook-like projection on its lower margin strongly curved outward.” Chillcott (1961) gave a ventral view on terminalia of *F. curvipes* (Fig. 2) and described them as follows: “Cercal plate very slender on apical half and prolonged into an upcurved process.” I cannot find this process on Chillcott’s ventral drawing (Fig. 2a), although on his lateral view (Fig. 2b) this process is clearly drawn. The differences between two species can be summarized as follows:

— Legs yellow, only tarsi black. Cercal plate slender. Nearctic species distributed in north-east of USA . . . . . *curvipes* Malloch

— Legs black, only knees yellowish. Cercal plate less slender. China, Yunnan . . . . .  
 . . . . . *baihualingensis* Yan, Xu, Wang & Zhang

Yan et al. (2019) illustrated genitalia of *F. fasciculata* by Hennig’s (1955, pl. 4, fig. 75) drawings (Fig. 3). Hennig was among pioneers of diagnostic use of the male genitalia, his drawing of Fanniidae (Hennig, 1955) are simplified but clear and helpful. (In my opinion Hennig’s approach is more useful than too intricate Chillcott’s drawings. For example, Hennig (1955, pl. 4, fig. 76) placed the drawing of the genitalia of *Fannia armata* Meigen, 1826 (another species with remarkably long surstyli) near that of *F. fasciculata*, so it is easy to see the difference between these species.) Based on Hennig’s drawing Yan et al. (2019) implied that the cercal plate of *F. fasciculata* has no curved process, while that of *F. baihualingensis* has. However, there is a more detail draw-



**Figs 5–8.** *Fannia fasciculata*: 5 — specimen from Moscow region; 6 — specimen from S Siberia; 7 — mid leg, posterior view; 8 — distribution: previous records — black spots, new records — red spots

**Рис. 5–8.** *Fannia fasciculata*: 5 — экзemplяръ из Московской области; 6 — экзemplяръ из южной Сибири; 7 — средняя нога, вид сзади; 8 — распространение: ранее опубликованные находки — черным цветом, новые находки — красным

ing of the genitalia of *F. fasciculata* in Rozkosny et al. (1997, 68, fig. 8e) reproduced here on Fig. 4. On this drawing there is a curved process, though it looks placed on the epanthrium instead of cercal plate. The situation is complicated by the fact that there is no verbal description of genitalia of *F. fasciculata* neither in Hennig (1955), nor in Rozkosny et al. (1997), nor anywhere else. Thus, the differences between the two species may be summarized as follows:

- *t2* with 3–5 *av*. Cercal plate slender. Europe; S Siberia . . . . . *fasciculata* Loew
- *t2* with 2 *av*. Cercal plate less slender. China, Yunnan . . . . .
- . . . *baihualingensis* Yan, Xu, Wang & Zhang

Comparison of my specimens from Moscow region and S Siberia and the photos in Yan et al. (2019) shows additional variability. The mesonotum of the Siberian (Fig. 6) and Chinese (Yan et al. 2019, 155, fig. 1a) flies is glossy black, while in the specimens from Moscow (Fig. 5) it is distinctly grey dusted. The abdominal tergite 1+2 is black in the Siberian fly (Fig. 6), while it is mostly yellow in other specimens (Fig. 5 and fig. 1d from Yan et al. 2019, 155).

How to treat these minute non-genitalic and doubtful genitalic differences between the considered taxa? To begin with, the taxa in question (*F. fasciculata*, *F. curvipes* and *F. baihualingensis*) obviously are closely related and share a set of unique diagnostic characters. The strongly sclerotized surstyli which are responsible for the external contact between males and females are the same. Thus, the crossbreeding between them is likely possible, but we have little hope of knowing that for sure. Recently similar difficulties were discussed by Vihhrev, Yanbulat (2019) where they tried to draw attention to disorder of today's taxonomy from oversplitting trend. In that publication they recommended not to forget the basic law of parsimony (Occam's presumption) and to offer only well-grounded changes in accepted taxonomy. According to this approach *F. curvipes* should be regarded as a valid species unless otherwise is proven. At least it is reliably geographically

isolated, it may be easy distinguished due to yellow legs and it is accepted as valid species during almost 100 years. Described just this year *F. baihualingensis* cannot be reliably distinguished and is not isolated, so *Fannia fasciculata* Loew, 1873 = *F. baihualingensis* Yan, Xu, Wang & Zhang, 2019, **syn. nov.**, unless otherwise is proven.

**New records.** Russia: Moscow reg., Kostino env., 56.316°N 37.768°E, 2.06.2010, N. Vihhrev, 1♂;

Krasnoyarsk reg., Ergaki NP, 52.839°N 93.254°E, 1450 m asl, 27–29.06.2017, N. Vihhrev, 1♂ (both Zoological Museum of Moscow University, Russia).

**Distribution.** *F. fasciculata* turned to be widely distributed (see Fig. 8). Initially I supposed that the species is uncommon because it needs some rare conditions. However, a large series of *F. curvipes* was collected in mixed deciduous forest at 1220 m asl in North Carolina and larvae were found there also in oak-leaf litter (Chillcott 1961), so at least closely related Nearctic species has ecological requirements typical for *Fannia*. Then, I can offer other explanation: *F. fasciculata* was described from Europe but it is originated from S-E Palaearctic. In the homeland, *F. fasciculata* was unknown till Yan et al. (2019) publication because this region was generally poorly studied, while in Europe the species probably began to spread only recently.

*Fannia xiaoi* Fan, 2000

*Fannia fani* Wang & Wu, 2017, **syn. nov.**  
Figs 9–20

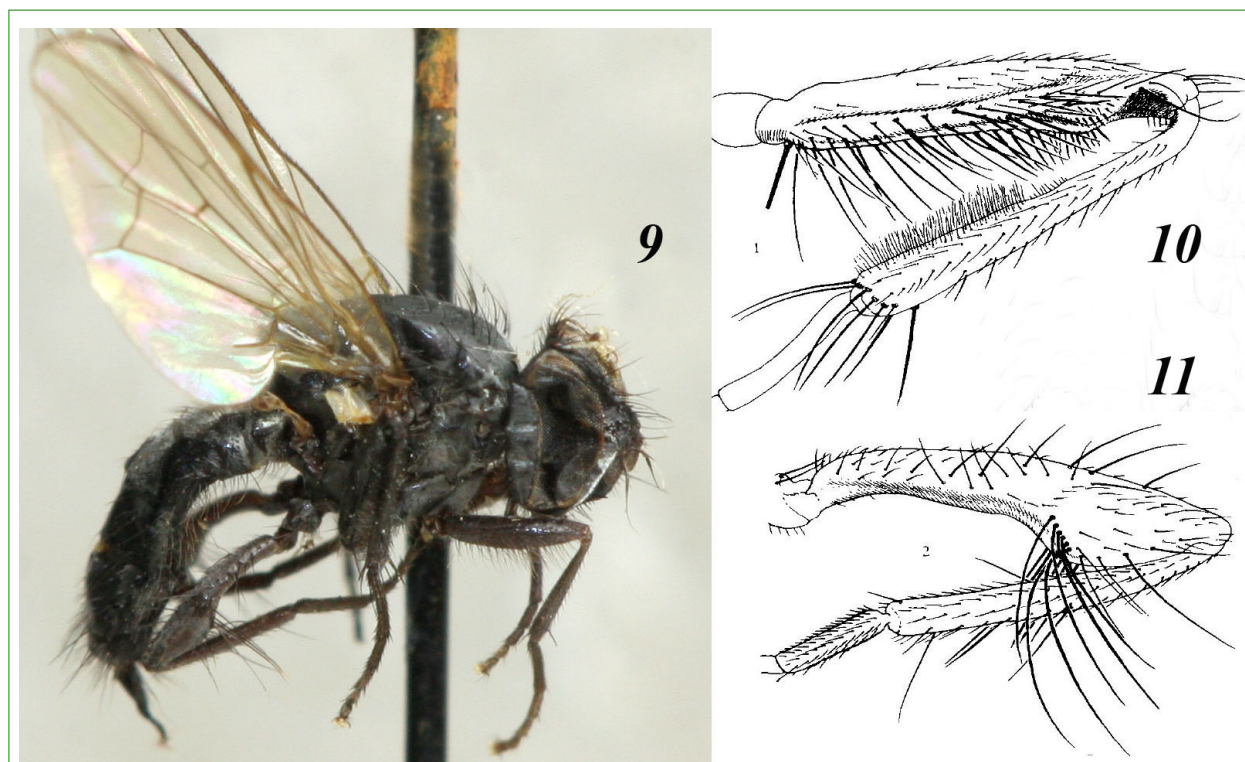
**Taxonomic notes.** *Fannia xiaoi* was described from China, Inner Mongolia, Hulunbuir [env.], Chuoer [= Chuo'er, 48.5°N 121.5°E, 1000 m asl], 28.05.1960, G-R. Xiao (Fan 2000). It has body and legs black; postpedicel short and wide; parafacials widened, 1.5x as wide as postpedicel; *t1* without submedian setae; *f2* with long and strong ventral setae (Fig. 10); *t2* with 1 *ad* and 2 *pd*, widened in apical 3/5, widened parts covered with ventral hairs (Fig. 10); *t3* with 1 *av* and 1 *ad*; coxa bare at inner posterior margin; lower calypter projecting.

*F. xiaoi* has several unusual diagnostic characters. Eyes with sparse but rather long whitish hairs. *t2* with a set of 8 elongated preapical setae (Fig. 10) resembling those in *Fannia spathiophora* Malloch, 1918. *tar2-1* curved and with a row of 8–9 *a* setulae 3–4x as long as tarsus width (Fig. 12). *f3* arcuate, in apical 1/3 with a large tubercle bearing 6–7 *av* and 5 *pv* very long (3/4 as long as length of *t3*) setae (Fig. 11). Apex of abdomen bears a dense tuft of long, waved, posteriorly directed setae, which is well seen on intact specimens (Fig. 9) (similar to that in *Fannia barbata* Stein, 1892 but even longer).

*F. xiaoi* has intricate terminalia (Figs 13–14). Cercal plate large and consists of two parts. Basal part bare medially while on lateral borders and especially posteriorly densely covered with long setae. Apical part of cercal plate long and stout, at apex bifurcated in two leaf-like processes (Fig. 15). Surstyli stout, deeply bifurcated in two processes: on ventral view inner process longer and more slender, outer one shorter and more stout

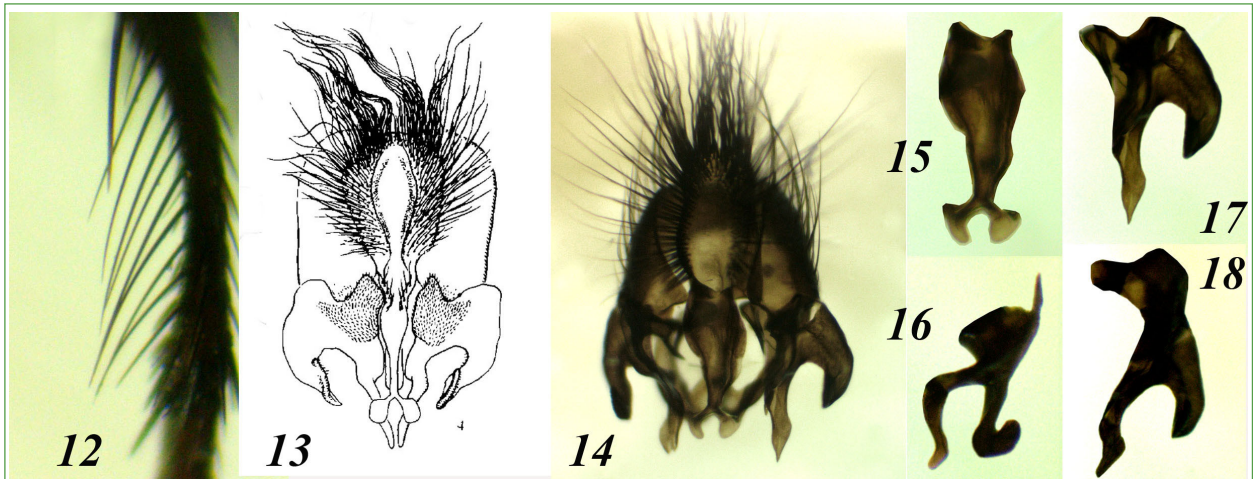
(Figs 17–18); on lateral view outer process strongly downcurved and rounded at apex, inner process less rounded and slightly up-curved at apex (Fig. 16).

In Figs 16–18 several illustrations of the surstylus of *F. xiaoi* are shown. Note that Figs 17–18 demonstrate that minor changes of the angle of ventral view lead to serious differences in a visible shape of the same sclerite (as recently discussed in Vikhrev, Yanbulat 2019). **Synonymy.** Recently *Fannia fani* Wang & Wu, 2017 was described from China, Heilongjiang, Wuying [48.1°N 129.2°E], 12.05.1979, J. Shen. It looks like a simplified *F. xiaoi*: parafacials less widened; *tar2-1* not modified, without elongated *a* setae; *t2* without set of elongated preapical setae; *f3* less arcuate, with a ventral tubercle less developed, this tubercle with only 4 shorter *av* setae; cercal plate with only short setulae on the same places (Figs 19–20). The statement by Wang et al. (2017) of 1+1 katepisternal setae instead of 0+1 in *F. xiaoi* is not correct, the latter also has 1+1 in both specimens examined by me. Beside the absence of long se-



Figs 9–11. *Fannia xiaoi*: 9 — general view; 10 — mid leg, posterior view; 11 — hind leg, anterior view (10 and 11 from Fan 2000, 346, figs 1–2)

Рис. 9–11. *Fannia xiaoi*: 9 — общий вид; 10 — средняя нога, вид сзади; 11 — задняя нога, вид спереди (10 и 11 из Fan 2000, 346, figs 1–2)



**Figs 12–18.** *Fannia xiaoï*: 12 — *tar2-1* covered with *a* setulae, dorsal view; 13 — male terminalia, ventral view (from Fan 2000, 346, fig. 4); 14 — male terminalia, ventral view; 15 — cercal plate, ventral view; 16 — surstylus, lateral view; 17 — surstylus, ventral view; 18 — the same surstylus viewed from slightly different angle, ventral view

**Рис. 12–18.** *Fannia xiaoï*: 12 — *tar2-1* с передними волосками, вид сверху; 13 — гениталии самца, вентрально (из Fan 2000, 346, fig. 4); 14 — гениталии самца, вентрально; 15 — церки, вентрально; 16 — сурстиль, латерально; 17 — сурстиль, вентрально; 18 — тот же сурстиль, вентрально, но под немного другим углом зрения

tae, the genitalia of *F. fani* is the same as those of *F. xiaoï* (see Fig. 20 taken from the original description Wang et al. 2017, 98, fig. 1c). Based on examination of my specimen I came to the same conclusion. Thus, there are only negative differences, such situation is typical for intersexual specimens frequently reported in Fanniidae (Gregor 1994). I regard the specimens described as *F. fani* as intersex males of *F. xi-*

*aoï*, so *Fannia xiaoï* Fan, 2000 = *F. fani* Wang & Wu, 2017, *syn. nov.*

**Relationships.** Chillcott (1961) divided the large genus *Fannia* into several species groups. His division was later generally accepted for the Palearctic *Fannia* (Rozkosny et al. 1997). Of course, these hypotheses should be sooner or later checked by molecular phylogeny. Wang et al. (2009 and 2017) placed *F.*



**Figs 19–20.** *Fannia xiaoï*, intersex: 19 — general view; 20 — male terminalia, ventral view (from Wang et al. 2017, 98, fig. 1c)

**Рис. 19–20.** *Fannia xiaoï*, интерсекс: 19 — общий вид; 20 — гениталии самца, вентрально (из Wang et al. 2017, 98, fig. 1c)

*xiaoi* and *F. fani* in the *F. carbonaria* species group. In my opinion the authors reasoning is groundless. To begin with the fact that there is no characteristic of *F. carbonaria* group neither in (Wang et al. 2009) nor in (Wang et al. 2017). I believe that *F. xiaoi* is related to *F. barbata*. These species share the following uncommon characters: a short and wide postpedicel; remarkably wide parafacials; hairy eyes; the apex of abdomen with a tuft of long setae. Both species are restricted to a spring time (*F. barbata* — early May, *F. xiaoi* — late May).

**New records.** Russia: *Buryatia* reg.: Ust-Zaza [53.2°N 111.7°E, 970 m asl], 31.05.1969, A. Rasnitsin & V. Zherikhin, 1♂; Baisa [53.98°N

113.59°E, 830 m asl], 28.05.1969, V. Zherikhin, 1♂; *Krasnoyarsk* reg., Tanzybei env., 53.07°N 93.13°E, 450 m asl, 28–29.05.2018, N. Vikhrev, 1 intersex ♂ (all Zoological Museum of Moscow University, Russia).

**Distribution.** China: Inner Mongolia and Heilongjiang; Russia: Buryatia and Krasnoyarsk regions.

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