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### ORIGINAL ARTICLE

#### *GLOSSIPHONIA FERGHANENSIS* SP. NOV. (ANNELIDA, HIRUDINIDA, GLOSSIPHONIIDAE): A NEW LEECH SPECIES FROM THE FERGHANA VALLEY, UZBEKISTAN

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### ABSTRACT

A new freshwater malacophagous leech belonging to the Glossiphoniidae Vaillant, 1890 family was found in a spring in the Fergana Valley. In this study, we describe the morphological characteristics and DNA barcoding gene of a new leech, *Glossiphonia ferghanensis* sp. nov. (Annelida, Hirudinida, Glossiphoniidae) are reported. This species differs from all other leeches of *Glossiphonia* Johnson, 1816 in coloration, the absence of papillae and paramedial rows on the dorsal surface. According to COI sequences, it was found to be a sister species with a specimen of *Glossiphonia concolor* (Apathy, 1888) recorded from the Taimyr Peninsula Region of Northern Russia. The analysis revealed that this species is a new glossiphoniid leech recorded from Uzbekistan.

Keywords: COI gene, Fergana Valley, Leeches, Morphology, mtDNA.

### INTRODUCTION

Leeches are mainly distributed in freshwater and marine environments but a few species appear occur even in terrestrial ecosystems (Sawyer, 1986; Sket and Trontelj, 2008). Currently, the subclass Hirudinea has more than 930 described species, of which about 250 species belong to the family Glossiphoniidae (Magalhães *et al.*, 2021; Bolotov *et al.*, 2022a, b; Foote *et al.*, 2022; Ben Ahmed *et al.*, 2023; Bolotov *et al.*, 2023; Cichočka *et al.*, 2023; Lin *et al.*, 2023). Glossiphoniid leeches are small, oval or leaf-shaped, dorsoventrally flattened, with 2-8 eyes and a proboscis. It differs from other leeches in that, during the reproductive period,

*Glossiphonia ferghanensis* sp. nov.

it carries cocoons and young individuals on its ventral side (Lukin, 1976; Bielecki, 1999; Light and Siddall, 1999; Kutschera and Wirtz, 2001; Govedich *et al.*, 2019; Solijonov *et al.*, 2023).

Species belonging to the genus *Glossiphonia* Johnson, 1816, have 4-6 eyes and the gonopores are separated by two annuli (segments) (Nesemann and Neubert, 1999). They usually feed by sucking the hemolymph of aquatic gastropod molluscs and oligochaetes (Siddall, 2005). Currently, about 20 species are generally included in this genus (Blanchard, 1894; Plotnikov, 1907; Stschegolew, 1912; Moore, 1924; Pawlowski, 1936; Soós, 1966; Lukin, 1976; Sawyer, 1986; Chandra, 1991; Bielecki *et al.*, 1999; Nesemann and Neubert, 1999; Bolotov *et al.*, 2022a, 2023). Other important genera in the family are *Alboglossiphonia* Lukin, 1976, *Boreobdella* Johansson, 1929, *Batracobdella* Viguier, 1897 and *Helobdella* Blanchard, 1896 (Lukin, 1976; Nesemann and Neubert, 1999).

The studies of glossiphoniid leeches in Central Asia, Plotnikov (1907) noted the presence of *Helobdella stagnalis* (Linnaeus, 1758) from Samarkand (Uzbekistan) and *Alboglossiphonia heteroclita* (Linnaeus, 1761), *Glossiphonia complanata* (Linnaeus, 1758) and *Hemiclepsis marginata* (O.F. Müller, 1773) from Astana (Kazakhstan). Later, *G. complanata* was recorded at two stations on the northeastern shore of Lake Issyk-Kul in Kyrgyzstan (Jueg *et al.*, 2013) and several species of *Glossiphonia* sp. were found in the Irtysh River basin in Kazakhstan (Fedorova and Kaygorodova, 2016). In the middle part of the Syrdarya water basin, G. Stschegolew (1912) reported the distribution of 4 species: *Theromyzon tessulatum* (O.F. Müller, 1774), *H. stagnalis*, *A. heteroclita* and *G. complanata*. *Alboglossiphonia amudargensis* (Molchanov, 1913) was recorded as a new species in Western Uzbekistan, in the Amu Darya basin (Molchanov, 1913). Other species belonging to the genus *Glossiphonia* have not been collected from other regions of Uzbekistan and research related to them has not been carried out.

In this article, we report a new species of the genus *Glossiphonia* based on specimens collected from springs in the Ferghana Valley of Uzbekistan.

## MATERIALS AND METHODS

**Specimens collection:** Specimen collection was carried out from 2020 to 2025 in springs of the Ferghana Valley in the eastern part of Uzbekistan, located in Central Asia (Map1). The distribution map of leeches was created using the ArcGIS v10.8 software (ArcGIS, 2019). Leeches were manually collected using conventional hydrobiological equipment.

*Glossiphonia* species are small and adhere firmly to the substrate with a posterior sucker. Therefore, the specimens can be difficult to collect and can be damaged during the collection process. However, as a reaction to the result of external influences such as gentle poking, they curl their entire body from head to tail, forming a spherical shape (Pl. 1 A). In this case, the “special handle” for leeches was constructed when separating leeches from the substrate was very convenient for collecting leeches quickly, in a healthy state (Pl. 1 B). The “special handle” is made of polyethylene, Its transparent tip allows the leech to be seen, and the tip is

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thinly arched to carefully remove it. The technology of operation is similar to that of a syringe, namely, the plunger pushes the leech out of the device (Pl. 1 C).

The total number of specimens collected was 65, and 26 (35%) of them were juveniles, while 39 (65%) were adult leeches carrying cocoons and embryos in their abdomen. The holotype was deposited in the collection of the Andijan State University (Andijan, Uzbekistan). Paratypes were deposited in the collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan (Tashkent, Uzbekistan) and in the Khayrulla Solijonov Leech Collection (Andijan, Uzbekistan). In addition, the species was recorded in zoobank under the number: urn: lsid: zoobank.org: act: 933FC978-F5A4-4B5B-B6DD-F45DFBD7D789.

**Morphological analysis:** Specimens were identified using the keys (Lukin, 1976; Tsyplenkina, 2016; Govedich *et al.*, 2019), and classification rank according to Nesemann and Neubertl(1999), Tessler *et al.* (2018), and Solijonov *et al.* (2024).

The following morphological characteristics of leeches were examined: body size, shape, surface and color; number and location of eyes; somite structure; the structure of the digestive and reproductive organs were studied based on data from Lukin (1976). Histological sections were prepared to examine the reproductive and digestive systems of the specimens were stained with hematoxylin and eosin (Bolotov *et al.*, 2022b). The external and internal morphology of the leech specimen was studied using a Carl Zeiss Stemi 508 stereomicroscope (Germany). The specimens were initially anesthetized in 10% ethanol for 20-30 minutes, then fixed in 96% ethanol (Jovanović *et al.*, 2021).

**Molecular analysis:** For molecular analysis of leeches, samples fixed in 96% ethanol were used. The methods of Folmer (1994), Kuchboev *et al.* (2020), and Solijonov *et al.* (2024) were used for DNA isolation, PCR processes and viewing of results.

**Phylogenetic analysis.** Using BLAST analysis (Altschul, 1990), all homologous COI sequences were identified and downloaded for species of the genus *Glossiphonia*. These data were complemented with a few selected sequences from other genera of the family Glossiphonidae to be used as an outgroup. Two phylogenetic trees were calculated. The first tree was based on 246 sequences and included all COI sequences available from GenBank. For the second tree, all sequences from members of the *Glossiphonia concolor* group were kept but for other species of *Glossiphonia* only selected sequences were included based on the results of the first phylogenetic tree: Clusters of highly similar sequences were represented in the second tree by only one member.

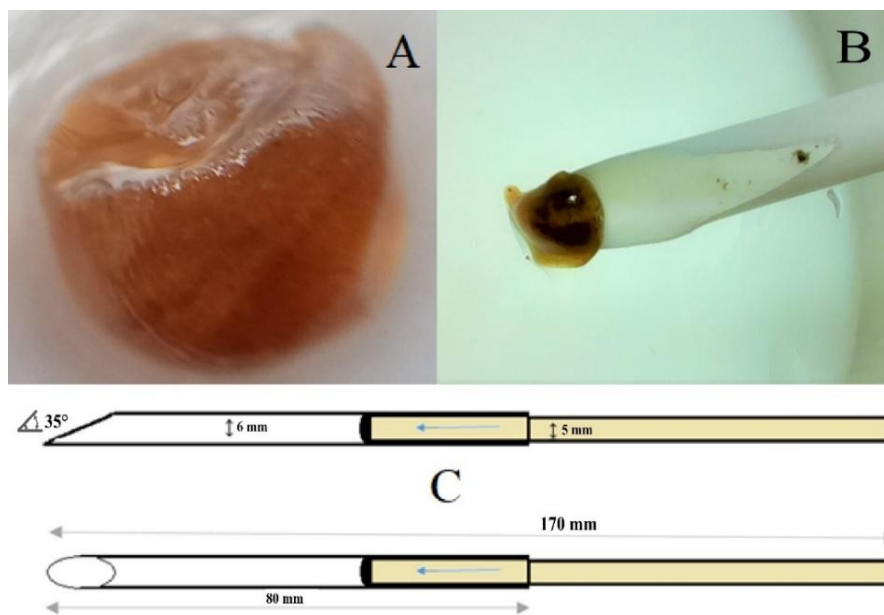
Sequences were aligned in Mega11 (Tamura, 2021) using Muscle (Edgar, 2004) based on codons. The resulting alignment was imported into Dambe 7.3.11 (Xia, 2018). For the third codon position, a test for substitution saturation according to Xia *et al.* (2003, 2013) was conducted. Then, two separate fasta files were created containing sequence information for

*Glossiphonia ferghanensis* sp. nov.

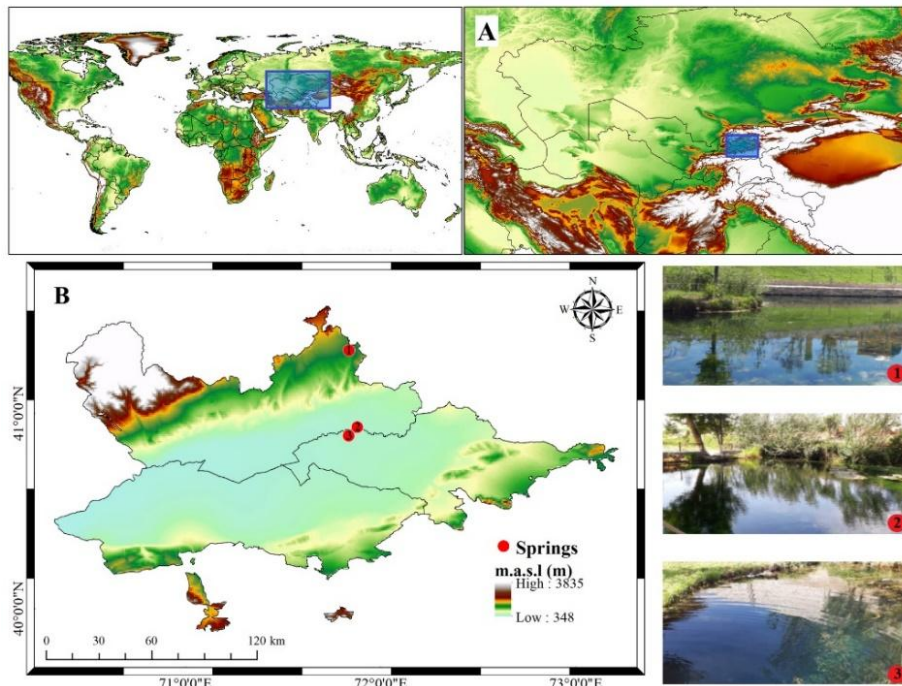
codon positions 1 and 2 and codon position 3. These separate files were merged and a RAxML type partition file was created using FASconCAT-G v1.0 (Kück *et al.*, 2014).

To calculate the final phylogenetic tree, the IQ-TREE webserver (Trifinopoulos *et al.*, 2016) based on IQ-TREE 1.6.12 (Nguyen *et al.*, 2015) using a partitioned model (Chernomor, 2016) was used. The optimal substitution model was chosen using Modelfinder (Kalyaanamoorthy *et al.*, 2017) including models with FreeRate heterogeneity (Soubrier *et al.*, 2012). The final model was automatically chosen based on the lowest Bayesian information criterion. Node support was calculated using ultrafast bootstrapping (Hoang *et al.*, 2018) with 1000 bootstrap trees and the Shimodaira-Hasegawa approximate likelihood ratio test (SH-aLRT). The final tree was visualized using FigTree v1.4.4 and further edited in Microsoft Paint 3D (FigTree, 2018, Microsoft Paint, 2023).

Species delimitation was performed using the Poisson tree processes (PTP) approach and the maximum likelihood and the Bayesian variant were applied in parallel. To calculate species delimitations, the PTP web server (Zhang *et al.*, 2013) was used, defining an outgroup as described above.



**Plate (1):** (A) Leech that forms a spherical shape, (B) The process of collecting leeches using a "special handle" equipment, (C) Top and side view of the "special handle" equipment.



**Map (1):** (A) Map of Uzbekistan located in Central Asia, (B) The place of leeches collected from the springs of Ferghana Valley. [Table (1) shows the names and coordinates of the areas marked with numbers].

#### RESULTS AND DISCUSSION

The specimens of *Glossiphonia ferghanensis* sp. nov. were collected from a spring in the Ferghana Valley in the eastern part of Uzbekistan (Map1, Tab. 1). The amber coloration of this leech, the absence of papillae and paramedian lines on the dorsal surface, and the shape of the eyes, including the large, spherical shape of the second pair of eyes, indicate that this leech represents a distinct species within the genus *Glossiphonia*.

#### Taxonomy

- Phylum: Annelida Lamarck, 1809
- Class: Clitellata Michaelsen, 1919
- Subclass: Hirudinea Lamarck, 1818
- Order: Hirudinida Siddall *et al.*, 2001
- Suborder: Glossiphoniiformes Tessler and de Carle, 2018
- Family: Glossiphoniidae Vaillant, 1890
- Subfamily: Glossiphoniinae Autrum, 1939
- Genus: *Glossiphonia* Johnson, 1816
- G. ferghanensis* sp. nov.

*Glossiphonia ferghanensis* sp. nov.**Table (1):** Locations of leech sampling in the Ferghana Valley, Uzbekistan.

No.	Collecting spring	Locality	Latitude/Longitude
1	Balikkul	Chartak District, Namangan Region	41°19'25.5"N, 71°50'11.3"E
2	Uchtepa	Uychi District, Namangan Region	40°55'49.3"N, 71°52'49.2"E
3	Kaynarbulak	Balikchi District, Andijan Region	40°53'09.5"N 71°50'08.6"E

**Holotype:** The specimen was collected on June 9, 2020, from the Balikkul spring (41°19'25.5"N, 71°50'11.3"E, 878 m above sea level) located in the Chortoq district of Namangan region, the Ferghana Valley of Uzbekistan, near the Sultan Uvais Karani shrine. This specimen was deposited in the collection of the Zoological Museum, the Faculty of Natural Sciences, Andijan State University (catalogue number ASUZM 155). Length of body 20.3 mm, width 6.1 mm; body with amber-colored, without papillae and paramedial lines on the dorsal surface, and the second pair of eyes large and round.

**Paratypes.** Body length 7-26 mm, width 2-7 mm, 18 specimens were collected on June 9, 2020 from the Balikkul spring (41°19'25.5"N, 71°50'11.3"E, 878 m above sea level) in Chortok District, Namangan Region (collected by Kh. Solijonov). They were transferred to the fund of the unique collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan (catalogue number IZAN 012-029), 26 specimens were collected on June 28, 2020 from Kaynar Bulak (40°53'09.5"N, 71°50'08.6"E, 409 m above sea level) Balikchi District, Andijan Region (specimens collector Kh. Solijonov).

The specimens were submitted to the collection of the Zoological Museum, Faculty of Natural Sciences, Andijan State University (catalogue number ASUZM 156-18), 20 specimens were collected on June 28, 2020 from Uchtepa spring, Norin District, Namangan Region, (40°55'49.3"N, 71°52'49.2"E, 415 m above sea level) and collected by researcher Kh. Solijonov. They are kept in the leech collection of Kh. Solijonov. (catalogue number FVZ 390-409).

**Etymology:** This species was first found by the authors in the Ferghana Valley. Therefore, in naming the species, it was named after this region.

**External morphology:** Small-sized leech; young specimens are 7-16 mm long and 2-3 mm wide; in adults the lengths and widths are 17-26 mm and 3-7 mm, respectively. Body shape ovate; edges of the body serrated. (Pl. 2 A, B, D).

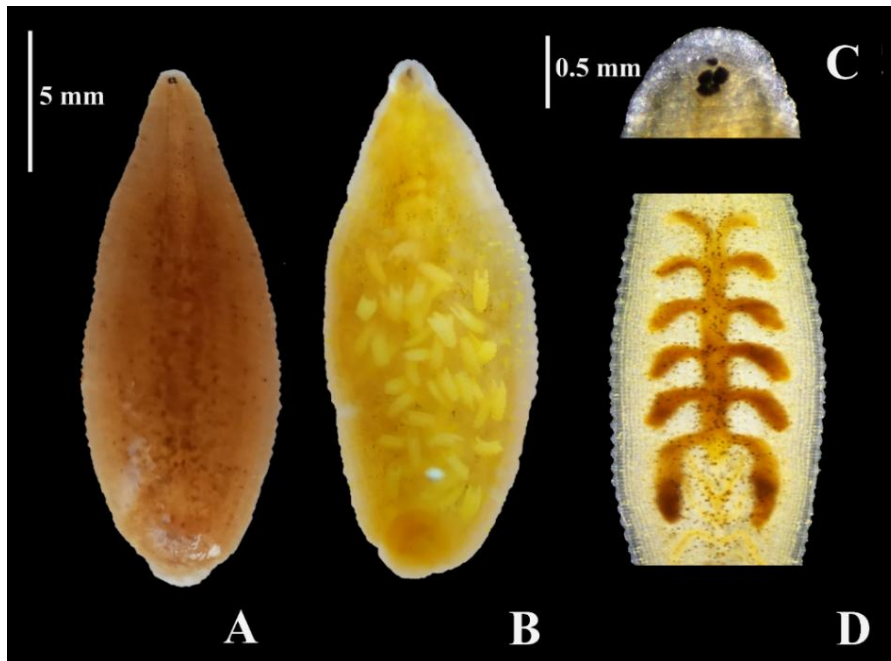
**Body coloring:** The dorsal side is orange, amber, with very small black-green spots, the surface is smooth, there are no papillae and paramedial rows (Pl. 2: A). The ventral side is yellow, with no spots (Pl. 2 B).

**Eyes.** There are three pairs of round eyes arranged in two rows at the same distance, 2 pairs larger. The first pair is hard to see, the next ones are easy to see (Pl. 2 C).

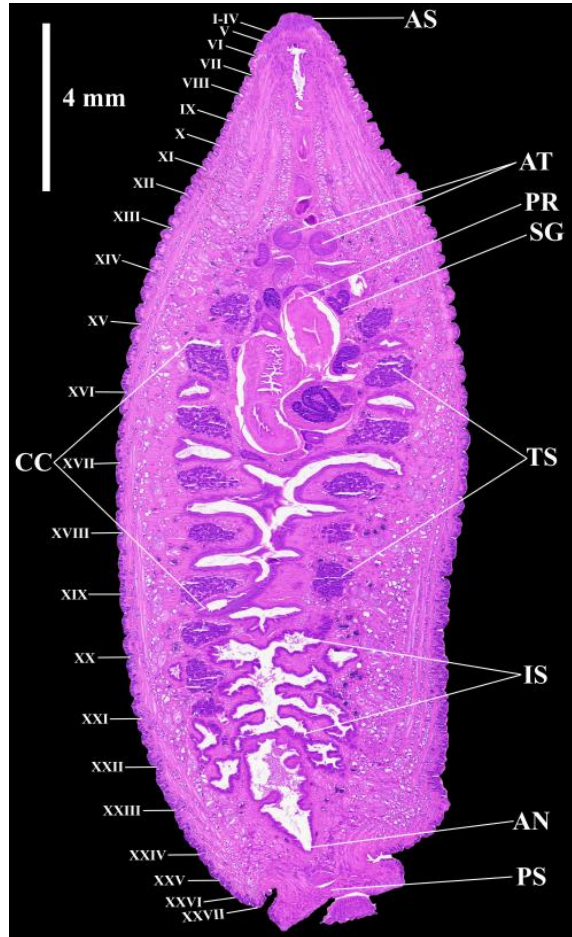
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**Annulation:** The total number of rings is 69-70: I-IV uniannulate, V-biannulate, VI-XXV triannulate, XXVI-biannulate, XXVII uniannulate (Pl. 3). The gonopores are separated by two rings.

**Digestive system:** Proboscis, salivary glands and six pairs of crop caeca are present, however, unlike other glossiphonids, the last caeca of the stomach are not branched, intestine with four simple processes (Pls. 2, 3).

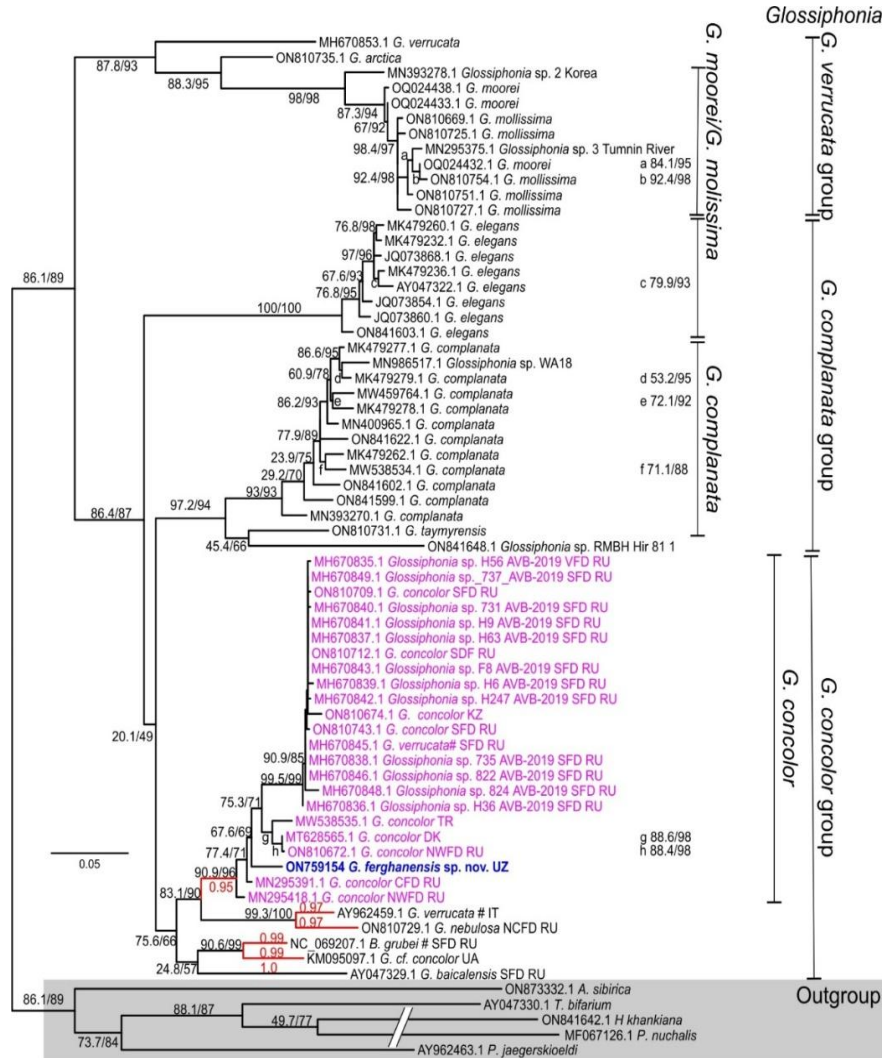


**Plate (2):** *Glossiphonia ferghanensis* sp. nov.; (A) Dorsal side, (B) Ventral side, (C) Eyes, (D) Crop caecae.

*Glossiphonia ferghanensis* sp. nov.

**Plate (3):** Anatomical features of *Glossiphonia ferghanensis* sp. nov. (annulation and digestive system): AS-anterior sucker, AT-atriums, PR-proboscis, SG-salivary glands, TS-testisacs, CC-six pairs of crop caeca, IS-intestine, AN-anus, PS-posterior sucker. Body somites are written using Roman numerals. [Photo by Khayrulla Solijonov]

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**Diagram (1):** A maximum-likelihood phylogenetic tree based on cytochrome oxidase I (COI) sequences of glossiphonid leeches. For the *G. concolor* group, all sequences from GenBank were included while for the other groups only selected sequences were included. Numbers at nodes are statistical estimates of node reliability with the results of ultrafast bootstrapping presented before and of the SH-aLRT behind the slash). Within *C. concolor* sensu lato, different predicted species are indicated by different colors. # indicates a sequence that was apparently misidentified or assigned to the wrong genus.

The current new leech was compared with other *Glossiphonia* species showing some differentiating morphological features (Tab. 2).

*Glossiphonia ferghanensis* sp. nov.**Table (2):** *Glossiphonia ferghanensis* sp. nov. leech morphological features compared with those of other *Glossiphonia* species

Species name	Length (mm)	Body	Eyes	Annulation (segments)	References
<i>Glossiphonia ferghanensis</i> sp. nov.	12-26	Body shape is ovate The dorsal side is orange, amber, with very small black-green spots, the surface is smooth, there are no papillae and paramedial rows	The eyes are round, 3 pairs, 2 rows at the same distance, 2 pairs larger. The first 1 pair is hard to see, the next ones are easy to see.	69-70	This study
<i>G. concolor</i>	18	Leaf-like body shape, caffeine-brown, smooth surface, 1 pair of paramedial lines	3 pairs, located close to each other	70	Bielecki <i>et al.</i> (1999); van Haaren (2004)
<i>G. nebulosa</i>	25	Oval, from light grey to light green-yellow, there are small papillae on the body surface	3 pairs, located close to each other, next merged 2-3 pairs	70	van Haaren, 2004; Utevsky <i>et al.</i> (2013)
<i>G. complanata</i> subsp. <i>Complanata</i>	20-40	Animals with dark and bright pigment patterns on the dorsal surface, dark and bright pattern arranged metamerically. There are papillae on the surface of the body	3 pairs, the first is smaller, the distance between the 2nd pair is larger	70	Lukin (1976); Sket (1968)
<i>G. complanata</i> subsp. <i>maculosa</i>	17	Body shape is ovate, dark brown. There are smaller papillae on anterior third of the body surface	3 pairs, the first is small	68-70	Sket (1968)
<i>G. elegans</i>	30	Oval, from beige to green or grey, there are a pair of dark paramedial lines on the dorsal and ventral sides	3 pairs separated	69-70	Mack and Kvist (2019)
<i>G. balcanica</i>	10	Oval, yellowish, there are irregular papillae on the surface of the body	3 pairs separated	70	Grosser <i>et al.</i> (2015)
<i>G. verrucata</i>	37-55	Ovate, green-transparent, with large papillae and lines on the surface.	3 pairs, the eyes are close together, round	70	Moser <i>et al.</i> (2012); Kaygorodova <i>et al.</i> (2014, 2020)
<i>G. paltudosa</i>	25-35	Oval, green-reddish, dorsal side 3 pairs of lines	3 pairs, located close	69	van Haaren (2004); Grosser <i>et al.</i> (2015)
<i>G. pulchella</i>	6	Oval, white-greyish yellow	3 pairs, located close	69-70	Sket (1968)

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**Molecular phylogenetic analysis:** PCR products for the partial (681 bp) COI gene were amplified and sequenced for this species. BLAST analysis against GenBank revealed that the COI sequence of this samples was most similar but not identical to sequences of the *G. concolor* complex. The maximal observed identity was 97.7% (96% query coverage). An initial phylogenetic analysis was conducted based on 247 COI sequences from glossiphoniid leeches with 238 sequences from the genus *Glossiphonia* (including one from *Baicalocleipsis grubei* that was initially included to be as an outgroup sequence) and 9 sequences that served as outgroup for the genus *Glossiphonia*. The tree is provided in Newick format in Supplementary data 1. A second phylogenetic tree was calculated using a smaller number of sequences. For this purpose, very similar sequences were only represented by a single sequence while the other sequences from the initial FASTA file were still included. This was done for all sequences that were not in the *G. concolor* sequence cluster from the first phylogenetic analysis while all sequences from the *G. concolor* cluster were kept. The second tree contained 63 ingroup (*Glossiphonia* spp. and *B. grubei*) sequences and five outgroup sequences. This tree is shown in Diagram (1). The sequence of *G. ferghanensis* sp. nov. is located in a heterogeneous cluster of sequences all assigned to the species *G. concolor*. A large number of very similar sequences most coming from Central Asia (most from Russia, Siberian Federal District, one from Kazakhstan) and one from the Volga Federal District of Russia in Eastern Europe contained the largest number of sequences. However, there were multiple sequences originating from Turkey, Denmark, the North-Western and Central Federal District of Russia that should considerably differences to the large cluster and they had also been identified as *G. concolor*. In order to determine whether this reflects natural variation within the species *G. concolor* or if it must be assumed that this represents a complex of closely related species [*G. concolor* sensu lato in Diagram (1)], a species delimitation approach based on the Poisson tree process method was used (Zhang *et al.*, 2013). This was based on the tree presented in Diag. 1 and the results are provided in Supplementary (Tab. 2). For the *Glossiphonia concolor* group (also containing *G. nebulosa*, *G. baicalensis*, a sequence from a specimen that was obviously misidentified as *G. verrucata* and *B. grubei*), the results of species delimitation using the maximum likelihood method are also indicated in the phylogenetic tree (Diag. 1).

Leeches belonging to the genus *Glossiphonia* differ from each other in body size, color, surface condition, the presence or absence of papillae, the shape and location of the eyes (Bolotov *et al.*, 2023). incomplete sentence (missing verb) than morphological and molecular features compared with: *G. complanata* subsp. *complanata*, *G. complanata* subsp. *maculosa* Sket, 1968, *G. verrucata*, *G. nebulosa* Kalbe, 1964, *G. concolor*, *G. paludosa* (Carena, 1824), *G. pulchella* Sket, 1968, *G. balcanica*, *Glossiphonia elegans* (Tab. 2). For example, subspecies such as *G. complanata maculosa*, *G. nebulosa*, *G. pulchella* are smaller in size. *G. ferghanensis* sp. nov. and others are larger. *G. ferghanensis* sp. nov. the body surface of the leech is smooth and the absence of papillae is similar to that of the *G. concolor* species, but it was distinguished by the absence of paramedial lines in it. All other species of *Glossiphonia* have dark stripes on the dorsal side. Species separated from subsequent pairs by the first pair of eyes: *G. complanata* subsp. *complanata*, *G. complanata* subsp. *maculosa*, *G. balcanica*, *Glossiphonia elegans* and the distance between the eyes is short or combined species: *G.*

*Glossiphonia ferghanensis* sp. nov.

*ferghanensis* sp. nov., *G. verrucata*, *G. nebulosa*, *G. concolor*, *G. Paludosa* and *G. pulchella* (Lukin, 1976; Nesemann and Neubert, 1999; Utevsky *et al.*, 2013; Grosser *et al.*, 2015, 2016; Jueg, 2018; Lindsay, 2020) (Tab. 2).

## CONCLUSIONS

When analyzing the distribution (zoogeography) of *Glossiphonia* genus *G. complanata* subsp. *complanata*, *G. verrucata*, *G. concolor*, *G. paludosa* and *G. elegans* were found to be the most common species. Including *G. complanata* subsp. *complanata* and *G. verrucata* in the Palearctic (Lukin, 1976; Moser *et al.*, 2012; Kaygorodova *et al.*, 2014, 2020), *G. concolor* and *G. paludosa* occur in Europe (Bielecki *et al.*, 1999; van Haaren, 2004), *G. elegans* occur in North America (Mack and Kvist, 2019). *G. nebulosa* and *G. balcanica* are found in Central and Southeastern Europe (Nesemann and Neubert, 1999; Grosser *et al.*, 2015; Utevsky *et al.*, 2013). *G. complanata* subsp. *maculosa* and *G. pulchella* are endemic species of Lake Ohrid in north Macedonia (Sket, 1968). Currently, the new species is endemic to the Ferghana Valley Uzbekistan.

Thus, based on the morphological and molecular genetic analyses investigation, the current species of *Glossiphonia* found in a natural spring in the Ferghana Valley of Uzbekistan can be considered a new species.

## CONFLICT OF INTEREST STATEMENT

We declare that there is no conflict of interest. We confirm that all the pictures in the manuscript all images in the manuscript are our original work. We also confirm, that there is no conflict of interest regarding the use of the laboratory of Andijan State University.

## ACKNOWLEDGMENTS

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### نوع جديد للعلق

*Glossiphonia ferghanensis* sp. nov.

(Annelida, Hirudinida, Glossiphoniidae)

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### الخلاصة

تم تسجيل نوع جديد للعلم من العلقيات المتخصصة في التغذية على الرخويات في المياه العذبة ينتمي إلى فصيلة *Glossiphoniidae* Vaillant, 1890 في أحد الينابيع الطبيعية بوادي فرغانة. هدفت هذه الدراسة إلى وصف الصفات المظهرية وتحليل الواسم الجيني المعتمد على تقنية الترميز الحمض النووي (DNA Barcoding) لنوع جديد هو *Glossiphonia ferghanensis* sp. nov. (شعبة Annelida، رتبة Hirudinida، عائلة Glossiphoniidae).

أظهرت النتائج أن هذا النوع يتميز عن جميع الأنواع المعروفة التابعة لجنس *Glossiphonia* Johnson, 1816 بصفات تشخيصية فريدة، تشمل نمط التلوين المميز، وغياب الحليمات، فضلاً عن عدم وجود الصفوف جار الوسطية على السطح

*Glossiphonia ferghanensis* sp. nov.

الظهري للجسم. كما بينت التحليلات الجزيئية المعتمدة على تسلسلات جين **Cytochrome c Oxidase Subunit I (COI)** أن النوع الجديد يرتبط بعلاقة تطورية وثيقة بوصفه نوعًا شقيقًا لـ *Glossiphonia concolor* (Apathy, 1888) المسجل سابقًا في منطقة شبه جزيرة تايمير شمال روسيا.

كما تؤكد نتائج الدراسة، المستندة إلى الأدلة المظهرية والجزيئية المتكاملة، أن *Glossiphonia ferghanensis* sp. nov. يمثل نوعًا جديدًا ضمن فصيلة Glossiphoniidae، ويُسجّل لأول مرة ضمن التنوع الحيوي للعراق في أوزبكستان، مما يسهم في توسيع المعرفة المتعلقة بالتنوع التصنيفي والتوزيع الجغرافي لهذه المجموعة الحيوانية في منطقة آسيا الوسطى.