

A new species of the genus *Skejotettix* (Orthoptera, Tetrigidae) from Nepal

MADAN SUBEDI^{1,2}

1 Agriculture Science Center, Directorate of Research and Extension, Agriculture and Forestry University, Ghyalchok, Gorkha, Nepal.
2 SIGTET-Special Interest Group Tetrigidae, Bonn, Germany.

Corresponding author: Madan Subedi (madansubedi13@gmail.com)

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Abstract

This paper describes a new species of *Skejotettix* Subedi, 2022, *S. kasalo* sp. nov., from the temperate forests of Bajung, Parbat, Nepal. The genus was known only from the subtropical regions of Nepal. The new species and its different life stages were observed in the natural habitat. It was found to have many colors that match perfectly with the surroundings. The genus *Skejotettix* was considered brachypronotal until now, but a macropronotal form was also found alongside the typical brachypronotal form in *S. kasalo* sp. nov. The macropronotal form is an important piece of the puzzle in determining the relationship between *Skejotettix* and *Ergatettix* Kirby, 1914.

Keywords

Gandaki Province, habitat, Parbat District, pygmy grasshoppers, sloping grassland, taxonomy, temperate forests, Tetriginae

Introduction

Nepal is a biogeographical and geomorphological pearl of Asia (Bhujju 2007), immensely rich in biodiversity, comprising 69 species of tetrigids (Subedi 2022, this paper). This number is remarkable given the size of the country. However, the fauna of Tetrigidae is still an understudied group of Orthoptera in Nepal (Subedi 2022, Subedi and Kasalo in press). This is mainly attributed to the lack of local researchers, as the sparse information available on the group was studied and collected entirely by foreign researchers (Chopard and Dreux 1966, Bey-Bienko 1968, Balderson and Yin 1987, Martens 1987, Ingrisch 1987, 2001a, b, 2006, Ingrisch and Garai 2001, Tumbrinck 2015). Now, with the advent of local researchers and collaborators, several species new to science have been discovered, and more information is available on these insects (Subedi 2022, Subedi and Kasalo in press).

Skejotettix Subedi, 2022 is a genus endemic to Nepal, hitherto comprising two small and brachypronotal subtropical species, *S. netrajyoti* Subedi, 2022 and *S. muglingi* (Ingrisch, 2001b)

(Ingrisch 2001b, Subedi 2022). With the discovery of a new species of the genus from temperate regions, this paper aims to describe this species, give insights into its ecology, and present some hypotheses on the evolutionary history of the genus.

Materials and methods

Museum abbreviations.—

ICAG Insect collection of Agriculture Science Center, Ghyalchok, Gorkha, Nepal.

Fieldwork.—The new species was spotted for the first time while photographing a *Criotettix* cf. *bispinosus* on a lichen-covered stone amid Crofton weed bushes (Fig. 2A) near the freshwater stream of Panikhola, Bajung, Parbat on 28th September 2022. Only a single individual female was spotted at that locality. Later on the same day, an adult male and a nymph were spotted on a clifftop of Basnee Gaun. More individuals were found in Kafleko Pakho, a location around 500 meters north of Basnee Gaun, when investigated two days later. As an entire population of the species was found in Kafleko Pakho, it was selected as the type locality. The holotype and several paratypes were photographed in the wild, collected by hand, killed using an ethyl acetate killing jar, and pinned with Phusis stainless steel pins (size #0) for storage in a collection box. Additional material is represented by photographs taken in the field. The localities were visited on a regular basis over a period of a month (September–October 2022) to gain more insights into the life stages and ecology of the species. The vegetation in the type locality were identified first by their vernacular names with the help of local people, which were then checked for the appropriate binomial names following Jnawali and Neupane (2021). This was again cross-checked with the help of images available on the internet.

Fieldwork localities.—(Figs 1, 2). The localities investigated by the author are listed in Table 1.

Table 1. Investigated localities in Bajung, Parbat, Nepal, with local Nepali names, coordinates, elevations, brief habitat type descriptions, and video links to the locality. Kafleko Pakho is the type locality.

Locality information	Localities		
	Kafleko Pakho	Basnee Gaun	Pani Khola
Nepali	काफ्लेको पाखो	बस्नी गाउँ	पानी खोला
Coordinates	28.27626°N, 83.69860°E	28.27321°N, 83.69778°E	28.27569°N, 83.70610°E
Elevation (m a.s.l.)	1920 (approx.)	1880 (approx.)	1665 (approx.)
Habitat type	Countryside road amid sloping grassland and forest	Sloping grassland on the edge of a cliff	Stream bank
Video link	https://youtu.be/JtwmYAKEayo	https://youtu.be/_B9wkh7LBRc	https://youtube.com/shorts/PNub1-S_b80?feature=share

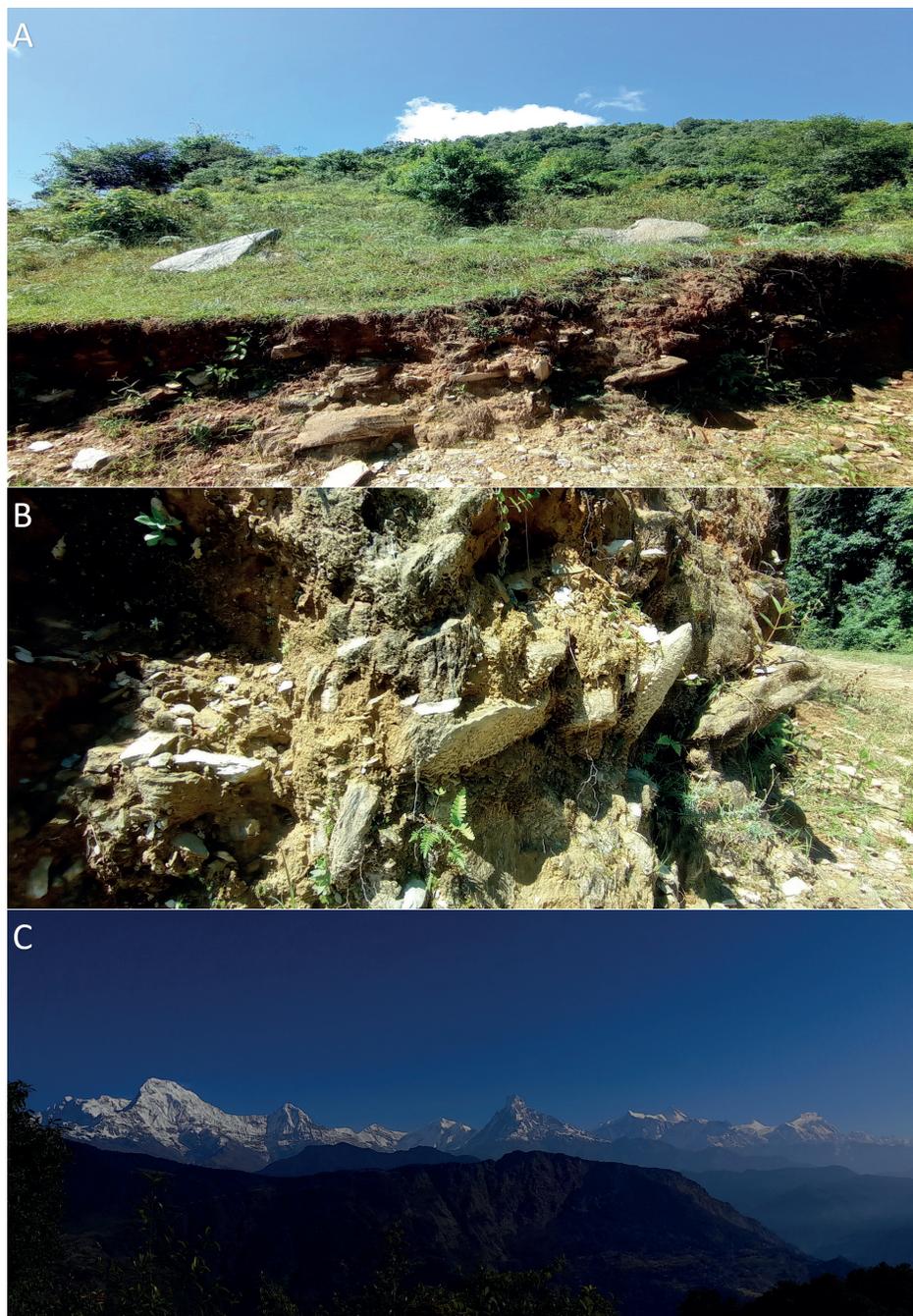


Fig. 1. Type locality of *Skejotettix kasalo* sp. nov., Kafleko Pakho, Bajung, Parbat. A. Sloping forest and grassland; B. Muddy walls alongside the dirt road through the type locality; C. Beautiful Annapurna and Mansiri Himal range seen from the type locality.



Fig. 2. Investigated localities from Bajung, Parbat, Nepal. A–C. Panikhola. A. Lichen-covered stone (indicated by a white arrow) amid Crofton weed bushes; B. Fresh water stream; C. Forest and bushes; D–E. Basnee Gaun. D. Pond and surroundings; E. Sloping grasslands.

Identification, taxonomy, and nomenclature.—The morphological characters of the new species were compared with the original descriptions of the aforementioned species of the genus *Skejotettix* Subedi, 2022 (Ingrisch 2001b, Subedi 2022). Taxonomy follows the international database of Orthoptera, the Orthoptera Species File (OSF), version 5.0/5.0 (Cigliano et al. 2022). Nomenclature is in accordance with the 4th edition of the International Code of Zoological Nomenclature (ICZN 1999).

Photography.—A Canon EOS 80D field camera, with a Canon macro lens 100 mm 1:2.8 USM, was used for photographing the species in their natural habitat and for type digitalization. Photos and videos of the localities and habitats were taken by mobile phone cameras (Xiaomi Redmi Note 9 and Xiaomi Poco C3). Images of the pinned type series were post-processed with the software Photoshop 2022 v40.0. The scale was added after calibration with millimeter paper with ImageJ v1.53k software (Rueden et al. 2017).

Morphological terminology and measurements.—Morphological terminologies follow Tumbrinck (2014), and measurements used follow Tumbrinck (2014) and Tan and Artchawakom (2015). The eye width and vertex width are measured as per Subedi and Kasalo (in press).

Results

Taxonomy

Family Tetrigidae Rambur, 1838
Subfamily Tetriginae Rambur, 1838

Genus *Skejotettix* Subedi, 2022

Updated generic diagnosis.—Small-sized, macropronotal or brachypronotal genus. Antenna inserted between or lower than the ventral

margins of compound eyes. Scapus of antenna with a large notch in lateral view. Frontal costa visible in front of the compound eyes in lateral view. Lateral carinae curved inward to the frontal costa in a more or less straight manner. Vertex narrower than the width of a compound eye. Median carina entire; raised in the anterior part of the pronotum. Wings extended beyond the pronotum, reduced, hidden, or absent. Femora robust.

Type species.—*Skejotettix netrajyoti* Subedi, 2022.

Composition.—Three species. *S. netrajyoti*, *S. muglingi*, and *S. kasalo* sp. nov. are currently known.

Distribution.—Endemic to Nepal, the genus (with its three species) is distributed in subtropical and temperate regions. *Skejotettix netrajyoti* is known only from the subtropical Sal forest of Churlingtar, Ghyalchok, Gorkha (Subedi 2022). *S. muglingi* is known from the Trishuli River near the Mugling Bazar riverbed (Ingrisch 2001b); the stream banks of Buldi khola, Vyas Municipality, Tanahun; in the vicinity of the manmade ponds of Ghadiyal Breeding Center, Kasara amid the subtropical Sal forest; and in the vicinity of the manmade ponds of Umari, Kapilvastu (Subedi 2022). *Skejotettix kasalo* sp. nov. is known from different localities of Bajung, Parbat, Nepal: Kafleko pakho (type locality), Basnee Gaun, and Panikhola. The locations are shown in Fig. 3.

Skejotettix kasalo sp. nov.

<https://zoobank.org/EF029366-B317-40FB-912B-DAA2C09F10C7>

Justification of genus assignment.—The herein-described species conforms to the typical characters of the genus *Skejotettix* as mentioned above in the diagnosis section.

Etymology.—The species is named after Niko Kasalo, an emerging tetrigidologist from Croatia and a good friend of mine. The



Fig. 3. Map of Nepal showing the distribution of *Skejotettix*. The district in green denotes the distribution of *S. netrajyoti*, with the precise locality denoted by a black triangle. The districts in blue denote the distribution of *S. muglingi*, with the precise localities denoted by red hearts. The district in dark red denotes the distribution of *S. kasalo*, with the precise locality denoted by a yellow dot. The map is adapted after Sagarjkhatri, own work, CC BY-SA 4.0, wikimedia commons. The localities for *S. muglingi* and *S. netrajyoti* are based on the findings of Ingrisch (2001b) and Subedi (2022). (Note: The names in the map refer to the respective adjacent districts in color.)

specific epitheton is a Latinized noun in apposition referring to the surname of Niko Kasalo (patronymic).

Common name.—Bajung's cliffhopper.

Common name etymology.—The first part of the name is after the village of Bajung where the species was discovered. The second part of the name denotes the habitat type of the species.

Type locality.—(Fig. 1) Kafleko Pakho, Bajung, Parbat, Nepal (Nepali: काफ्लेको पाखो, बाजुङ, पर्वत, नेपाल) situated at an altitude of 1920 m a.s.l. with GPS coordinates, 28.27626°N, 83.69860°E. The type locality is situated at the top decile of the hill of Bajung village, which has a cool temperate climate. The area is a part of the Dhiku-Maidan community forest with sloping terrain composed of grassland and forest. The ground vegetation includes *Ageratina adenophora* (Spreng.) King & H. Rob., *Anaphilis* sp., *Nephrolepis cordifolia* (L.) C. Presl, *Gnaphalium affine* D. Don, *Rubus ellipticus* Sm under the cover of *Symplocos theifolia* D. Don, *Daphniphyllum himalayense* (K. Rosenthal), *Rhododendron arboreum* Sm., *Schima wallichii* (DC.) Korth, *Prunus cerasoides* D. Don., *Eurya acuminata* DC., *Semecarpus anacardium* L.f., *Myrsine semiserrata* Wall., *Elaeagnus parvifolia* Wall. ex Royale, and *Myrica esculenta* Buch.-Ham. ex D. Don. A dirt road (constructed in 2019) now runs through the locality; the road has mud walls, supporting a plethora of moss and algal growth. The holotype and several paratypes, as well as additional materials, were collected and photographed on these walls.

Material examined.—**Type material**. **Holotype** (Fig. 5A–C): NEPAL • ♀; Gandaki Province, Parbat District, Modi Rural Municipality, Bajung, Kafleko Pakho; 28.27626°N, 83.69860°E; 1920 m a.s.l.; 30.IX.2022; M. Subedi leg.; countryside road amid sloping grassland and forest, collected by hand, ICAG; ICAG-ORT-TETR1.

Paratypes.—(Figs 5D–L, 6) NEPAL • 1♂; Gandaki Province, Parbat District, Modi Rural Municipality, Bajung, Basnee Gaun; 28.27321°N, 83.69778°E; 1880 m a.s.l.; 28.IX.2022; M. Subedi

leg., sloping grassland on the edge of a cliff, collected by hand, ICAG; ICAG-ORT-TETR2 • 1♀; Gandaki Province, Parbat District, Modi Rural Municipality, Bajung, Panikhola; 28.27569°N, 83.70610°E; 1665 m a.s.l.; 28.IX.2022; M. Subedi leg.; stream bank; collected by hand, ICAG; ICAG-ORT-TETR3 • 1♂; Gandaki Province, Parbat District, Modi Rural Municipality, Bajung, Kafleko Pakho; 28.27626°N, 83.69860°E; 1920 m a.s.l.; 30.IX.2022; M. Subedi leg.; countryside road amid sloping grassland and forest; collected by hand, ICAG; ICAG-ORT-TETR4 • 1♀; Gandaki Province, Parbat District, Modi Rural Municipality, Bajung, Kafleko Pakho; 28.27626°N, 83.69860°E; 1920 m a.s.l.; 11.X.2022; M. Subedi leg.; countryside road amidst sloping grassland and forest, collected by hand, ICAG; ICAG-ORT-TETR5.

Additional material.—Several adults and nymphs were photographed in the wild to study the characters and variations among individuals. The videos recorded are uploaded to the social media platform YouTube (YouTube channel: Nepali Grasshoppers, https://www.youtube.com/channel/UCp9QdbRCPSy19KZ-bnsPw_JQ).

Photographic material.—The specimens of the type series in their natural habitat are shown in Fig. 4.

Diagnosis.—*Skejotettix kasalo* differs from the type species of *Ergatettix* Kirby, 1914, *E. dorsiferus* (Walker, 1871) in having a wider vertex with parallel lateral borders instead of a narrow vertex with lateral borders usually converging towards the front, with convex vertex (in frontal view) without horns instead of being concave with the presence of horns, and with the middle femora being robust instead of being slender. However, the species also share similarities: (i) presence of a notch on the scapus of the antenna; (ii) wings extending beyond the pronotum (valid in macropronotal form of *S. kasalo*); (iii) antennal grooves distinctly below the ventral margins of compound eyes; and (iv) median carina (in lateral view) undulated.

Skejotettix kasalo sp. nov. can be differentiated from other species of the genus by the set of characters listed in Table 2.

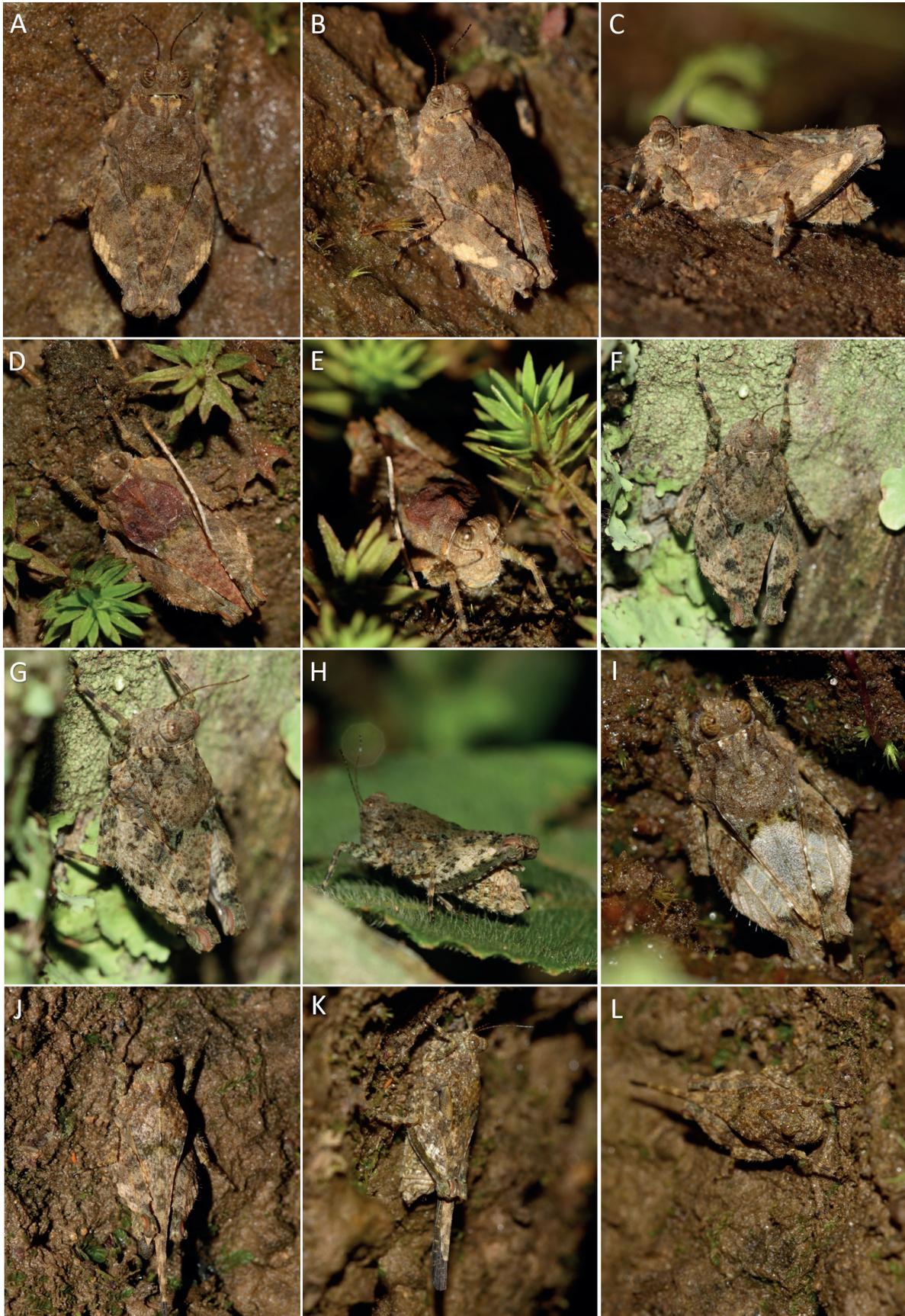


Fig. 4. The type specimens of *Skejotettix kasalo* sp. nov. in their natural habitat. A–C. Holotype (♀); D–E. Paratype 1 (♂); F–H. Paratype 2 (♀); I. Paratype 3 (♂); J–L. Paratype 4 (♀).

Table 2. Comparison of the diagnostic characteristics of the three currently known *Skejotettix* species.

Character	<i>S. kasalo</i> sp. nov.	<i>S. netrajyoti</i>	<i>S. muglingi</i>
Upper point of insertion of the antennal grooves	Below the lower margin of the compound eyes	In line with the lower margin of the compound eyes	In line with the lower margin of the compound eyes
Pronotum	Brachypronotal or macropronotal; apex bluntly rounded	Brachypronotal, cuneate with apex emarginate	Brachypronotal, obtuse-angularly rounded
Alae	Produced distinctly beyond or slightly shy of the pronotum	Reduced	Reduced, absent, or hidden
Median carina (in lateral view)	Distinctly undulated	Undulated	Relatively uniform
Claws	Larger	Shorter	Shorter
Infrascapular area	Intermediate in width	Narrower	Widened
Scutellum (in relation to scapus)	Wider	Almost as same width	Narrower
Habitat	Temperate forests	Subtropical Sal forests	Near the water sources of the subtropical regions

Description.—**Head:** Eyes reniform. Top margin of eyes higher than vertex. Vertex low and flat between lateral carinae of vertex. Frontal costa bifurcates at around half length of compound eye from top. Facial carinae divergent, forming scutellum as wide as scapus before widening distinctly at bottom. Lateral carinae of vertex following outline of eye anteriorly; curved inward, almost straight at half-length of frontal costa from the top. Nodules distinct from top of vertex to halfway of compound eye. Paired ocelli placed at about bottom third. Top margin of antennal groove below lower margin of compound eyes. Minute hairs distributed all over face. Caudal margin of eye not in contact with anterior margin of pronotum. Vertex below top margin of eyes. Frontal costa visible as straight in front of anterior level of eyes, incurves halfway from top of compound eye, diverges into two facial carinae and runs straight down to lower margin of compound eye. Facial carinae curve outwards, forming a convex protrusion. Head exerted above general surface of pronotum, vertex approximately at level of elevation in anterior part of pronotum. Hairs present in lower half of face. Vertex at base of eyes wider than an eye, slightly narrowing anteriorly, as wide as an eye at its apex. Anterior margin of vertex in line with anterior margin of the eyes; frontal costa produced slightly ahead of anterior margin of eyes. Medial carina of vertex extending slightly beyond anterior half of vertex between eyes. Lateral carinae of vertex present in anterior half of vertex between eyes. Fossulae shallow, elongated, and present in anterior two-thirds of vertex between eyes. Posterior margin of eyes distinctly in front of anterior margin of pronotum.

Antennae. Filiform. As long as length between anterior margin of head and lateral lobes of pronotum. Scapus with a large notch in lateral view. The number of antennomeres is 16, with apical one consisting of fused segments, possibly 2 segments.

Pronotum: Brachypronotal, tip of the pronotum slightly shy of tip of abdomen. Sub rectangular. Median carina raised in anterior part of pronotum above vertex giving a tectiform appearance. Median carina sinuate, with most prominent elevation at transition between prozona and metazona; undulation gradually decreases in elevation afterwards. Prozonal carinae elevated, clearly visible. Prozona sulcated with sulci of an irregular shape. Lateral lobe sub-rectangular, sub-rounded. Ventral and tegminal sinus in shape of an obtuse angle. Humero-apical carina distinctly visible. Infrascapular area long; subrectangular in anterior half, gradually narrowing toward end. Lateral area progressively widening caudally. Small nodules present

throughout the surface of pronotum. Small nodules distributed over entire surface. Anterior margin of pronotum truncated. Prozonal carinae distinct, converging caudally. Median carina continuous, reaching apex of pronotum. Lateral lobes projected downward; apex sub-rounded. Humeral angles oblique. Pronotum progressively narrowing caudally, ending in bluntly rounded apex. External lateral carina undulating. Internal lateral carina converges internally in last fifth, thereafter runs straight to tip, exposing wide lateral area. Two dark humeroapical spots present.

Wings: Alae not reaching apex of pronotum. Tegmina oval, entirely visible.

Legs: Fore legs setulose over entire length. Fore femora about 3.36 times as long as wide; dorsal margin denticulate; ventral margin erose. Fore tibia maculate; dorsal and ventral margins crenulate. Fore tarsus with first segment short (dark brown to black in color); second segment maculate, elongated, and with claws. Mid femora about 3.36 times as long as wide; dorsal margin denticulate; ventral margin erose; dorso-external and ventro-external carinae distinct; area enclosed between the ventro-external carina and ventral margin concave. Mid tibia Setose; dorsal and ventral margins erose; ventral margin with large spines. Mid tarsus with first segment short (dark brown to black in color); second segment maculate, elongated, and with claws. Hind femora robust; about 2.41 times as long as wide; its dorsal margin serrate, serrations uniform throughout length of dorsal margin before being raised into a group of closely placed 5 dents just before antegenicular tooth; ventral margin erose; antegenicular teeth arc-shaped, tip pointed. Hind tibia Smooth; ventral margin with large spines. Hind tarsus with first segment long (dark brown to black in color), having pulvilli with spinose tips; second segment small, third elongated and with claws.

Sexual dimorphism.—No dimorphism observed between sexes except body size and terminalia. Female: Ovipositor valves widened; serrated with pointed apex. Male: Subgenital plate widened; curving upwards with blunt apex.

Notes on variability.—*Skejotettix kasalo* sp. nov. is known to have two forms: macropronotal and long-winged (Figs 4J–L, 6, video: <https://youtu.be/boJsRQK9LSU>), and brachypronotal and short-winged (Fig. 5). The undulation of the median carina in lateral view is more distinct and higher in the brachypronotal form than in the macropronotal form.



Fig. 5. Holotype (♀) of *Skejotettix kasalo* sp. nov. A. Lateral view; B. Frontal view; C. Dorsal view. Paratype 2 (♀) of *Skejotettix kasalo* sp. nov. D. Lateral view; E. Frontal view; F. Dorsal view. Paratype 1 (♂) of *Skejotettix kasalo* sp. nov. G. Lateral view; H. Frontal view; I. Dorsal view. Paratype 3 (♂) of *Skejotettix kasalo* sp. nov. J. Lateral view; K. Frontal view; L. Dorsal view. Scale bars: 1 mm.

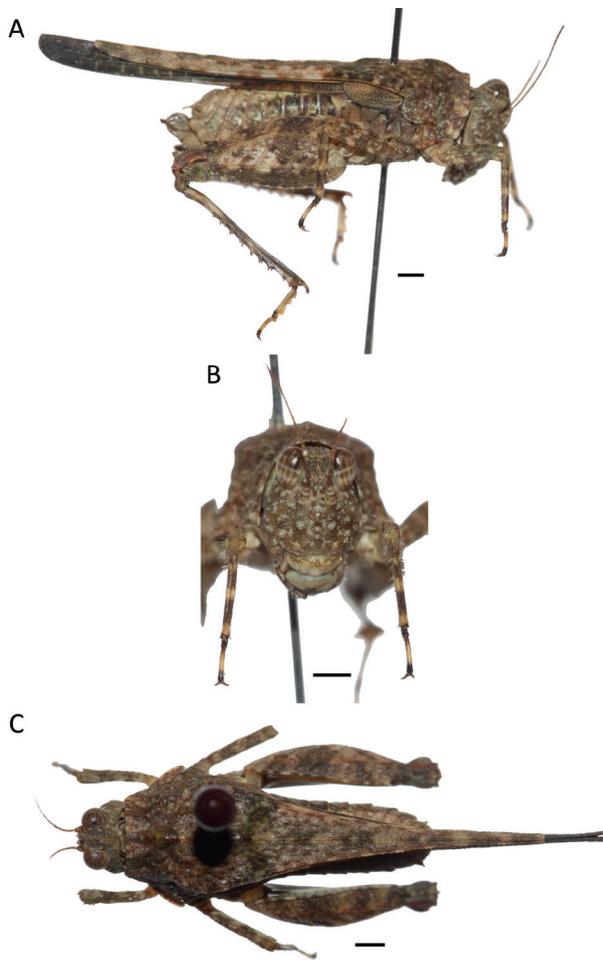


Fig. 6. Paratype 4 (♀) of *Skejotettix kasalo* sp. nov. A. Lateral view; B. Frontal view; C. Dorsal view. Scale bars: 1 mm.

The posterior margin of the compound eyes in most of the pinned specimens, including the holotype and those photographed in nature, do not reach the anterior margin of the pronotum. However, in some cases, such as paratype 2, the eyes reach the anterior margin of the pronotum due to the position of the head during the fixation process and the way it was pinned.

Coloration.—The coloration is cryptic, enabling the individuals to perfectly blend in with their surroundings (Fig. 7). For example, individuals found on the stones with lichen growths are entirely (Fig. 7A) or partially (Fig. 7E) blue-green in coloration, while individuals found on the muddy walls are light to rusty brown in coloration (Fig. 7B–D, F–I). The coloration can be uniform throughout the body (Fig. 7A, B, D, E, I), mottled, or different in the anterior and posterior halves of the body (Fig. 7C, E, G, H).

Nymphs.—(Fig. 8) The nymphs resemble the adults (Fig. 8) in coloration and the majority of the traits. However, the nymphs differ from adult individuals in having shorter pronotum (pronotum nearly reaches the hind knees in brachypronotal and extends beyond the hind knees in macropronotal adults), absence of wings, lack of antegenicular teeth on hind femora, poorly developed external genitalia, and the carinae being comparatively more distinctly expressed. The nymphs develop from one instar to the other by casting off the exoskeleton in the form of exuviae (Fig. 9) in the process of molting. Typically, the parts from the tip of the vertex to the tip of the pronotum are opened dorsally (Fig. 9B) to let the individual tetrigid out while the other parts remain intact. The intactness of the exuvia might make them useful for some morphological studies.

Measurements.—The key measurements of the holotype and paratypes are presented in Table 3.

Closely found species.—Two tetrigids, *Crietettix* cf. *bispinosus* (Fig. 10A) and *Hedotettix* sp. (Fig. 10B), were found alongside *Skejotettix kasalo* sp. nov. in the localities investigated.

Table 3. Measurements (in mm) of the holotype (HT) and the paratypes (PT) of *Skejotettix kasalo* sp. nov.

Body parts	HT(♀)	PT1(♂)	PT2(♀)	PT3(♂)	PT4(♀)	Avg. (♀)	Avg. (♂)
Body length	11.77	9.70	10.44	9.85	13.27	11.83	9.78
Vertex width	0.62	0.61	0.65	0.58	0.67	0.65	0.60
Eye width	0.69	0.68	0.70	0.65	0.71	0.70	0.67
Scutellum width	0.31	0.31	0.32	0.31	0.33	0.32	0.31
Pronotum length	9.11	8.65	8.67	6.74	14.19	10.66	7.70
Pronotum lobe width	4.54	4.08	4.47	3.66	4.79	4.60	3.87
Pronotum height	3.04	2.93	2.92	2.47	3.10	3.02	2.70
Tegmen length	1.71	1.75	1.80	1.34	2.14	1.88	1.55
Tegmen width	0.71	0.69	0.68	0.52	0.81	0.73	0.61
Alae length	6.05	6.61	5.58	4.43	12.58	8.07	5.52
Fore femur length	2.52	2.26	2.38	2.06	2.54	2.48	2.16
Fore femur width	0.75	0.72	0.70	0.61	0.68	0.71	0.67
Mid femur length	3.10	2.45	2.58	2.33	3.17	2.95	2.39
Mid femur width	0.99	0.82	0.69	0.67	0.89	0.86	0.75
Post femur length	6.81	6.51	6.63	5.41	6.45	6.63	5.96
Post femur width	2.82	2.73	2.76	2.39	2.65	2.74	2.56
Hind tibia length	6.42	5.72	6.09	4.98	6.59	6.37	5.35
First tarsal segment (basal) length	0.98	0.99	1.13	0.93	1.33	1.15	0.96
Third tarsal segment (apical) length (without claws)	0.78	0.77	0.84	0.77	0.94	0.85	0.77
Subgenital plate length	–	0.89	–	0.72	–	–	0.81
Subgenital plate width	–	0.51	–	0.50	–	–	0.51
Ovipositor dorsal valve length	1.22	–	1.08	–	1.34	1.21	–
Ovipositor dorsal valve width	0.58	–	0.47	–	0.64	0.56	–
Ovipositor ventral valve length	1.04	–	1.01	–	1.19	1.08	–
Ovipositor ventral valve width	0.36	–	0.35	–	0.39	0.37	–

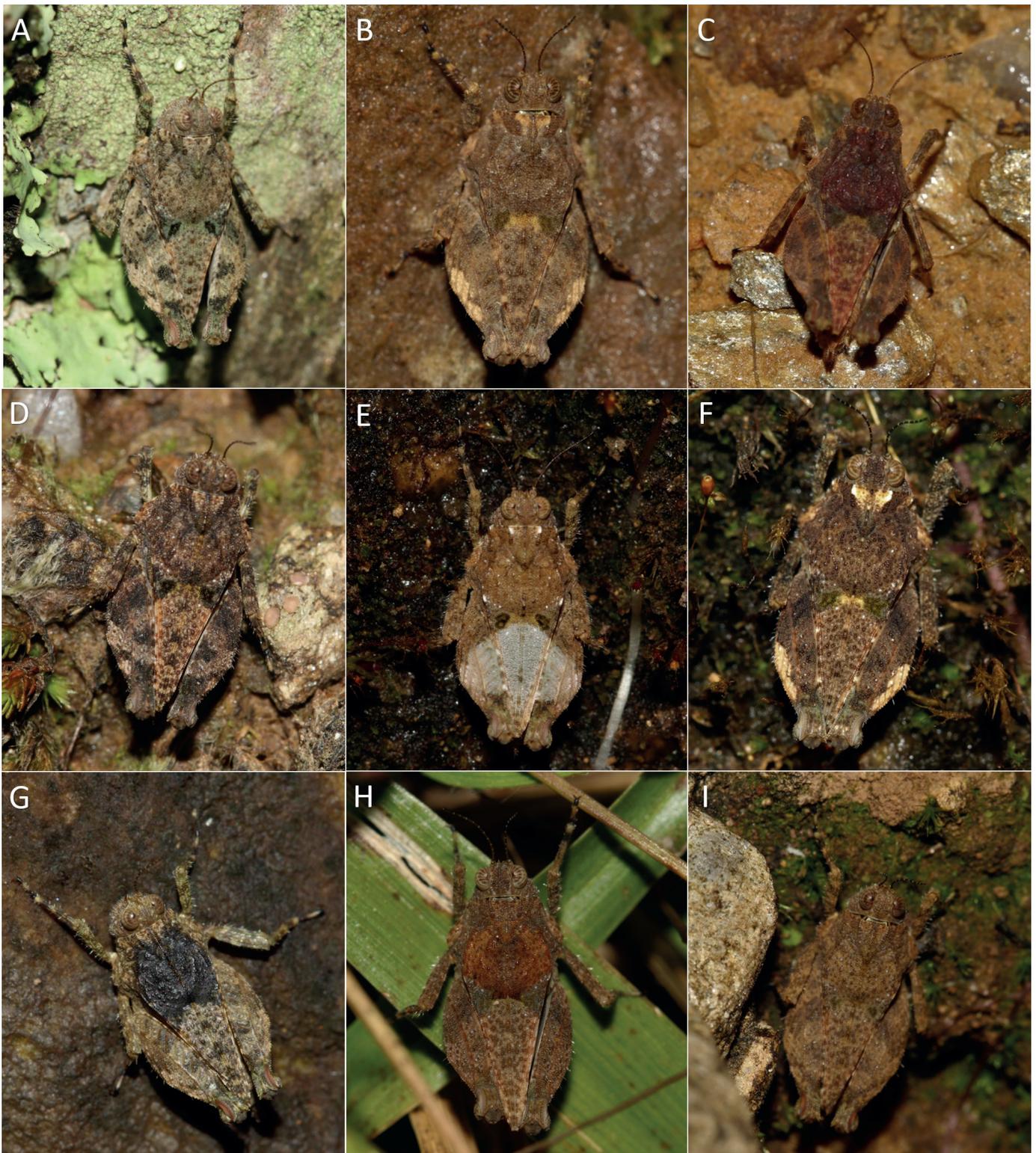


Fig. 7. Variability of coloration in *Skejotettix kasalo* sp. nov.

Food source.—The individuals of *Skejotettix kasalo* sp. nov. were observed feeding on food sources such as detritus (Fig. 11A), moss (Fig. 11B), lichens (Fig. 11C), and algae (Fig. 11D). Video links: A nymph feeding in the wild: <https://youtu.be/6CeSekOTe4w>; An adult feeding in the wild: <https://youtu.be/PWYw-7Rvt3U>.

Discussion

Hitherto, the genus *Skejotettix* comprised species with distributions restricted to the subtropical regions of Nepal (27.55362°N–27.98745°N; 155–460 m a.s.l.) (Subedi 2022). With the discovery of *S. kasalo* sp. nov. from the temperate regions (28.27569°N–

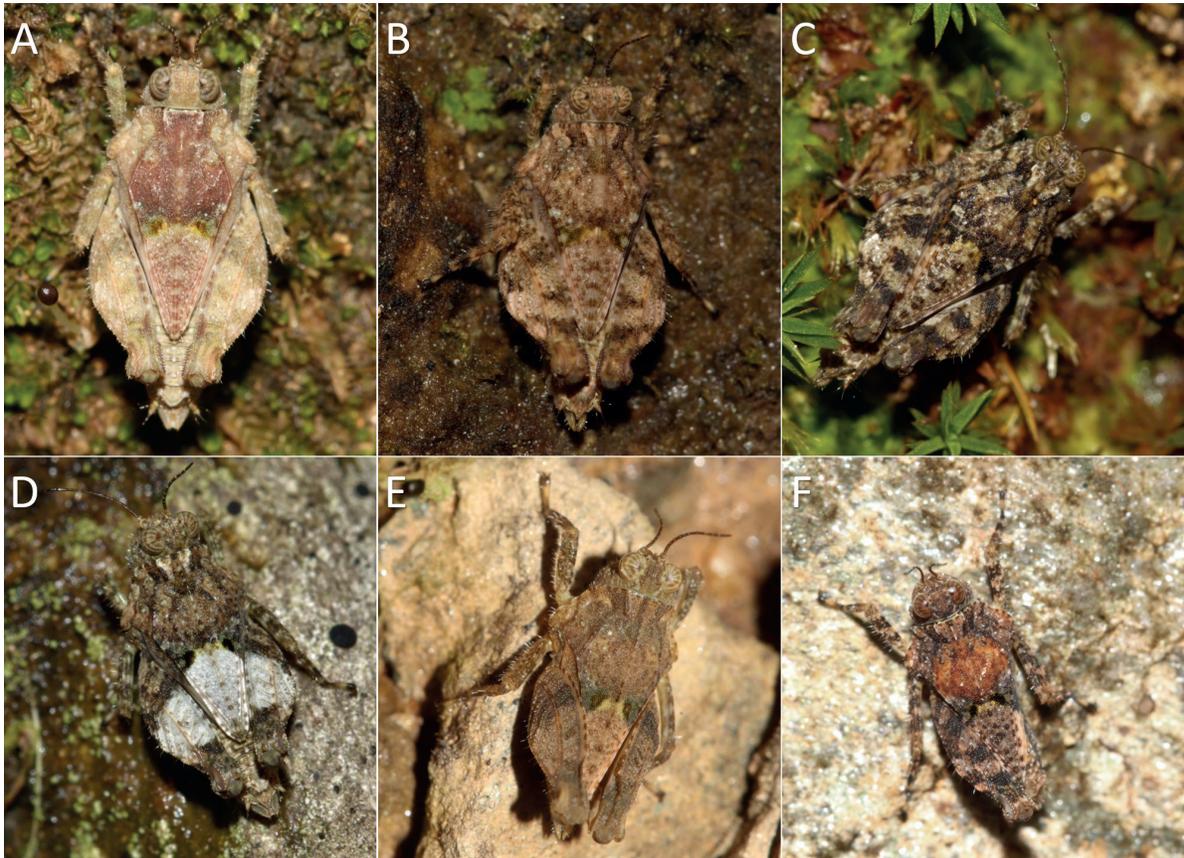


Fig. 8. Different nymphal instars of *Skejotettix kasalo* sp. nov. in natural habitat. (Note: the images are not on the same scale.)



Fig. 9. Exuviae of *S. kasalo* sp. nov. in natural habitat. (Note: A–C are the images of different views of the same exuvia.)

28.27626°N; 1665–1920 m a.s.l.), the distribution range of this genus has expanded along the altitudinal and climate gradient. The new species has a forest-type habitat similar to that of *S. netrajyoti*. However, the flora composition and climatic conditions of the forests are entirely different. There is not much known about the seasonality of all species of the genus. However, *S. netrajyoti* is observed only during the hot and humid summer months, with the nymphal stage as the probable overwintering stage (Subedi 2022). The observation of nymphs as the most abundant life stage during the last weeks of September (coinciding with the onset of winter) hints at nymphs as the probable overwintering stages and, thereby, the presence of seasonality in *S. kasalo* sp. nov. However, further studies and research should be done to verify this. Only two Tetrigidae species were found alongside *S. kasalo* sp. nov. One reason for the low number of species could be attributed to the time of the year (beginning of winter) of the study period. Taylor and Kerkut (1958) showed that poikilotherm insects show decreased activities with a decrease in the temperature of the surroundings. Furthermore, this was the first time the above-mentioned localities were studied for Tetrigidae, and the study was limited to the outskirts of temperate forests. Therefore, future studies penetrating the unexplored areas during the summer months are certain to provide more information on the species composition and more insights into the biology, seasonality, and ecology of *S. kasalo* sp. nov.

Until now, *Skejotettix* was known to be a brachypronotal and short-winged species (Ingrisch 2001b, Subedi 2022); in *S. netrajyoti*, the wings are reduced while hidden and absent in *S. muglingi*. However, a macropronotal and long-winged form co-exists

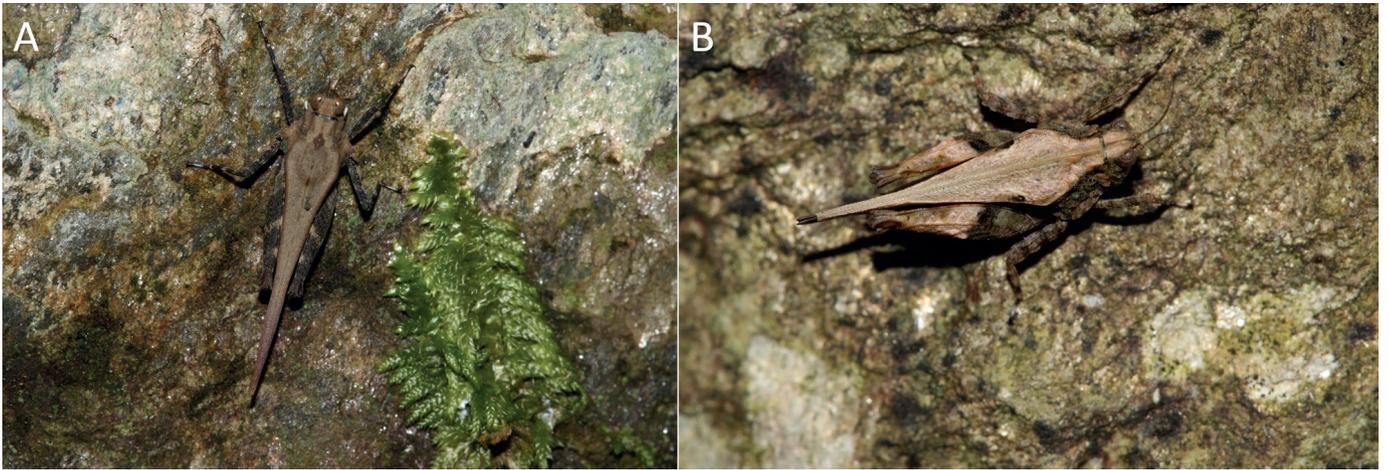


Fig. 10. Tetrigids closely found with *Skejetettix kasalo* sp. nov. A. *Criotettix* cf. *bispinosus*; B. *Hedotettix* sp.

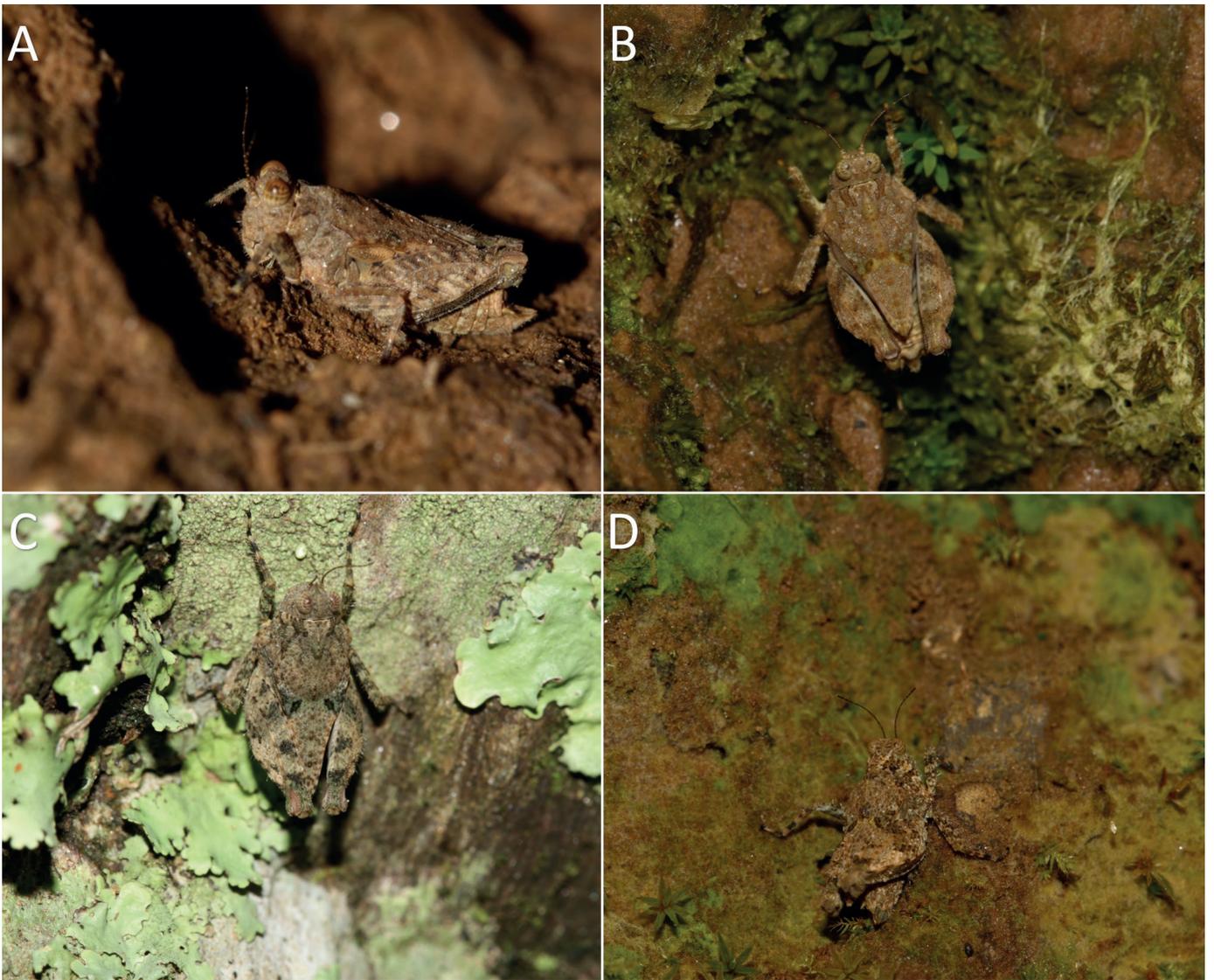


Fig. 11. Individuals of *Skejetettix kasalo* sp. nov. on different food sources. A. Detritus on the muddy walls; B. Moss growth on the muddy walls; C. Lichen growth on the stones; D. Algal growth on the dirt road through the type locality (Note: A, C. Adults; B, D. Nymphs)

alongside the typical brachypronotal and short-winged form in *S. kasalo* sp. nov. This phenomenon is also known in other Tetrigininae, such as some species of *Paratettix* (Rehn and Grant 1957, Tumbrinck 2015). The presence of both the macro- and brachypronotal forms in *S. kasalo* sp. nov. suggests that it might be a basal species on the evolutionary tree of the genus *Skejotettix*. It has a variable morphology from which the morphologies of the rest of the species in the genus could have been derived. It is also possible that apterousness appeared several times independently within *Skejotettix*. However, the evolutionary idea is just a hypothesis provided to direct future studies. Considering the variability of forms within *S. kasalo* and the similarities between *Skejotettix* and *Ergatettix* (denoted under Diagnosis), the hypotheses that the two genera are closely related and that there is an evolutionary relationship between the species of *Skejotettix* are important to mention but should be carefully explored through detailed morphological and molecular studies, which is beyond the scope of this paper.

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