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New taxa of *Pterostichus* (Coleoptera: Carabidae) from Vietnam

Новые таксоны *Pterostichus* (Coleoptera: Carabidae) из Вьетнама

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KEY WORDS: Coleoptera, Carabidae, *Pterostichus*, new subgenus, new species, Vietnam, Oriental region.

КЛЮЧЕВЫЕ СЛОВА: Coleoptera, Carabidae, *Pterostichus*, новый подрод, новый вид, Вьетнам, Ориентальная область.

ABSTRACT. New seven species, *Pterostichus* (*Morphohaptoderus*) *glabellus* **sp.n.**, *P.* (*M.*) *primitivus* **sp.n.**, *P.* (*M.*) *unisetosus* **sp.n.**, *P.* (*Neohaptoderus*) *austrinus* **sp.n.**, *P.* (*Vietosteropus*) *subirideus* **sp.n.**, *P.* (*Vietoderus* **subg.n.**) *laevibasis* **sp.n.**, and *P.* (*Phonias*) *batdaiensis* **sp.n.**, all from Vietnam, are described. *Pterostichus* (*Circinatus*) *tonkinensis* Straneo, 1980, is re-described based on fresh material. Interrelations of five subgenera of the *Argutor* lineage, including *Phonias*, are discussed based on external morphological characters, male and female genitalia and reproductive tract. A key to the subgenera of the lineage is provided. New synonymy is established: *P.* (*Ph.*) *ussuriensis* (Tschitschérine, 1897) = *P. burkhan* Berlov et Anichtchenko, 2005, **syn.n.**

РЕЗЮМЕ. Из Вьетнама описаны 7 новых видов: *Pterostichus* (*Morphohaptoderus*) *glabellus* **sp.n.**, *P.* (*M.*) *primitivus* **sp.n.**, *P.* (*M.*) *unisetosus* **sp.n.**, *P.* (*Neohaptoderus*) *austrinus* **sp.n.**, *P.* (*Vietosteropus*) *subirideus* **sp.n.**, *P.* (*Vietoderus* **subg.n.**) *laevibasis* **sp.n.**, и *P.* (*Phonias*) *batdaiensis* **sp.n.** *Pterostichus* (*Circinatus*) *tonkinensis* Straneo, 1980, переописан. На основе анализа признаков наружной морфологией имаго и полового аппарата обоих полов обсуждаются взаимоотношения 5 подродов эволюционной ветви *Argutor*, включая *Phonias*; составлена таблица для их определения. Установлены новые синонимы: *P.* (*Ph.*) *ussuriensis* (Tschitschérine, 1897) = *P. burkhan* Berlov et Anichtchenko, 2005, **syn.n.**

Introduction

The speciose genus *Pterostichus* Bonelli, 1810 (Coleoptera: Carabidae) is largely Holarctic in distribution, with some species ranging as far south as southern China and Indochina. In this paper, we re-describe one species and contribute seven new ones, all from Vietnam, to the genus. These species belong to the subgenera *Phonias* Gozis, 1886; *Morphohaptoderus* Tschitschérine, 1898; *Neohaptoderus* Tschitschérine, 1898; *Circinatus* Allegro et Sciaky, 2010; *Vietosteropus* Fedorenko, 2017; and *Vietoderus* **subg.n.**

Material was collected during several field trips and expeditions to highlands of Central and northern Vietnam, sponsored by the Joint Russia-Vietnam Tropical Centre.

Acronyms used are as follows: MSNM — Museo Civico di Storia Naturali, Milan; SIEE — the author's reference collection at A.N. Severtsov Institute of Ecology & Evolution, Russian Academy of Sciences, Moscow; ZMMU — Zoological Museum of the Moscow State University.

The following parameters were analyzed (Table): maximum body length measured between apices of closed mandibles and apex of elytra (BL); distance between base of elytron and discal pore d***n*** (D***n***, ***n*** = 1, 2, 3); length of elytron, measured from the highest point of basal margin to apex (EL); metepisternum length along outer margin (est3L) and width along anterior margin (est3W); maximum width of elytra (EW); width of head across eyes (HW); width of pronotum between apical (PA) or basal (PB) angles; length of pronotum along median line (PL); distance between apex and level of maximum width of pronotum, measured along mid-line (PLw); maximum width of pronotum (PW).

Other abbreviations include US, umbilical seta, of USS, umbilical seta series running on elytral interval 9. Coxa, trochanter, femur, tibia, and tarsus are abbreviated to *cx**n***, *tr**n***, *fe**n***, *ti**n***, and *ta**n*** (***n*** = 1, 2, 3 for pro-, meso- and metathorax, respectively).

Measurements were taken using an eyepiece micrometer within the accuracy of two decimal places. The means are given in round brackets for the ratios, with the number of measured specimens (**n**) indicated

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for the first ratio in the description. All labels are printed. Data on labels of type specimens are in quotes, new line being marked with slash.

Results

Pterostichus Bonelli, 1810

Subgenus ***Morphohaptoderus*** Tschitschérine, 1898

Tschitschérine, 1898a: 190 (*Feronia* subg.); Sciaky, 1994: 1; Shi et al., 2013: 105.

Type species: *Haptoderus maximus* Tschitschérine, 1889, subsequently designated by Jeannel [1937].

DIAGNOSIS. A polytypic subgenus of *Pterostichus* from southern China to northern Vietnam, defined chiefly by *cx*3 trisetose, *tr*3 setose and the body apterous, with metepisterna short.

REDESCRIPTION (For recognition only). Body small- to medium-sized, BL 4.8–13 mm. Dorsum shiny black, often iridescent, sometimes dull in female. Head rather small, eyes convex to flat, neck constriction indistinct. Antennae filiform, moderately long, scape with preapical seta, pedicel with ventral seta and often with a few short setae toward apex; antennomeres 4–11 and often extreme apex of antennomere 3 pubescent. Submentum bi- or quadrisetose.

Pronotum flattened, each side mostly finely beaded, with basal angle distinct and two basolateral sulci on each side.

Elytra rather wide at bases, with striae 1–7 inside humeral angle; humeri and humeral tooth mostly distinct, parascutellar seta present and parascutellar striole short or missing. Interval 3 with discal setae varying from species to species in number as well as in position, sometimes multiple or missing. USS consisting of 16–17 (mostly 16) or 14–15 US in larger or smaller species, respectively; US arranged into a row 6–1–1–… (US1–6 — US7 — US8–…), *i.e.*, sparser at middle, and adjoining stria 8 while US3 adjoining striae 8 and 9.

Body setation otherwise complete, including clypeus bisetose, two supraocular setae, two elytral apical setae in stria 7, *fe*1 with three posterior setae, *fe*2 with two anteroventral setae in basal three fifths and 2–4 anterodorsal setae in apical two fifths, *fe*3 bisetose; *ti*3 mostly without lateral setae. Tarsomere 5 glabrous or setose ventrally.

Prosternal process flat or with indistinct median groove, apex truncate and indistinctly bifid in anteroventral view due to the median groove more impressed at extreme apex, angles rounded or blunt; inclination flat, with lateral beads converging ventrad to enclose triangular dorsal part or nearly so. Abdominal sternite VII bi- (♂) or quadrisetose (♀) at apex, not modified in male.

Legs rather slender; *ti*1 anterior face smooth and glabrous; *ta*2 and *ta*3 mostly with tarsomeres 1–3 carinate laterally and bisulcate dorsolaterally; posterior (inner) sulcus being more shallow than anterior (outer) one and varying from distinct to totally obliterate between species.

Aedeagus rather typical for the genus, median lobe in lateral view strongly curved to geniculate, with apical orifice left dorsolateral to nearly dorsal; left paramere quadrate, with a deep dorsobasal fissure; right paramere short. Everted and inflated internal sac curved first leftward and then ventrad and slightly basad, sometimes apicad only.

Female tergite VIII moderate in length (moderately wide), with basolateral apodemes slightly less sclerotized toward tips; sternite VIII mostly well sclerotized laterobasally, densely setulose along apical margin to glabrous or nearly so. Tergite IX: laterotergite with apical margin rounded and densely setose, setae varying between species in length; gonosubcoxite with a short row of fairly short and dense setae along laterobasal margin; gonocoxite triangular, more or less crescent, with preapical nematiform seta, 2–3 outer (ventral) and one, sometimes two, inner (dorsal) ensiform setae. Reproductive tract rather characteristic of the genus: *bursa copulatrix* trapezoidal, with apex invaginated and sclerotized; spermatheca long, subdivided into long and narrow seminal canal and shorter subclavate receptacle; spermathecal gland duct long.

COMMENTS. This subgenus includes over 30 described and a number of undescribed species from China. Three species described below are very similar to one another in body size and appearance and share similar male and female genitalia, but their some, derived, characters are unusual for the subgenus. These polythetic characters include some elytral setae missing, parascutellar or discal, or both, and the inclination of the prosternal process not apically beaded. Furthermore, the *cx*3 setae tend to be reduced from three to two in number. The posterior two setae are short or vestigial yet constantly present in *P. glabellus* **sp.n.** while the inner seta is absent from one (*P. unisetosus* **sp.n.**, one of two specimens examined) or both (*P. primitivus* **sp.n.**) sides.

Pterostichus (*Morphohaptoderus*) *glabellus* Fedorenko, **sp.n.**

Figs 1, 12–13, 22, 30, 43–45, 54–55, 64–65.

MATERIAL. Holotype ♂ (ZMMU) and 12 paratypes (SIEE): 3♂♂, ♀, labelled: ‘N[orthern] Vietnam, Lao Cai Prov[ince]./ Hoang Lien Son Mt.ridge,/ env. Fansipan [= Phan Xi Pang] Mt, Tram Ton/ h = 1950-2100 [m],/ 15-30./ leg. VII.2007’; 4♂♂, 4♀♀, with same label except ‘…/ env. Phan Xi Pang Mt,/ Tram Ton/ pitfall traps/ leg. A.Anichkin V–VI.2006’.

Genitalia examined in three males and one female.

DIAGNOSIS. A medium-sized species of the subgenus, recognizable by the elytra with no parascutellar or discal setae and *fe*3 conspicuously sexually dimorphic.

DESCRIPTION. BL 8.6–9.5 mm. Body (Fig. 1) shiny black and slightly iridescent, antennae, palps, femora at extreme apices and tarsi red; femora dark brown, tibiae reddish brown or slightly reddish, extreme lateral margin of pronotum in basal two thirds reddish, elytra slightly reddish along sides in apical half. Dorsal microsculpture superficial and isodiametric on head, slightly transverse on neck, very superficial, consisting of moderately to fairly transverse meshes, on pronotum, and of very dense transverse lines on elytra.

Head very small, without neck constriction. Genae about a third as long as convex eyes, meeting neck at obtuse angle. Frons smooth. Clypeus barely sinuate at apical margin, frontoclypeal suture nearly straight. Frontal sulci short, impunctate, moderately deep, diverging toward and not reaching the level of anterior supra-ocular setae, slightly extended onto clypeus. Labrum rectangular, truncate apically, with an oblong and shallow fovea at middle. Mandibles very obliquely and very densely striated on dorsal side, scrobe with longitudinal sulcus. Terminal palpomeres fusiform, penultimate labial palpomere bisetose. Submentum quadrisetose.

Pronotum quadrate and rather convex, with sides evenly rounded, broadest just in front of middle. Base almost half wider than apex, subconvex, with a vestigial basal bead outside inner basolateral sulci; angles obtuse, with a nearly indistinct blunt tooth. Inner basolateral sulci deep, impunctate, running almost parallel to each other on basal third while not quite reaching base; outer sulci short and indistinct. Apex slightly sinuate, apical angles nearly right, blunt, slightly projecting. Median line fine yet deep, obliterate basally and apically. Lateral bead fine, very so in front of anterolateral

Figs 1–5. Dorsal habitus: 1 — *Pterostichus glabellus* **sp.n.**, paratype ♀; 2 — *P. unisetosus* **sp.n.**, holotype; 3 — *P. primitivus* **sp.n.**, holotype; 4 — *P. subirideus* **sp.n.**, paratype ♂; 5 — *P. batdaiensis* **sp.n.**, paratype ♂ from Sa Pa env.

Рис. 1–5. Габитус дорзально: 1 — *Pterostichus glabellus* **sp.n.**, паратип ♀; 2 — *P. unisetosus* **sp.n.**, голотип; 3 — *P. primitivus* **sp.n.**, голотип; *P. subirideus* **sp.n.**, паратип ♂; 5 — *P. batdaiensis* **sp.n.**, паратип ♂ из окрестностей Sa Pa.

seta, slightly wider behind. Apical bead obliterate in about middle fourth.

Elytra elliptic, very convex behind middle in lateral view, broadest at about or slightly behind middle, slightly rounded on sides, more so toward base and toward apices, these rounded combined; preapical sinuation slight, preapical plica distinct in lateral view. Base rather narrow, basal ridge nearly straight. Humeri rounded, humeral angle obtuse yet sharp and minutely toothed. Striae deep, impunctate or indistinctly crenulate, stria 7 opposite humeral angle; parascutellar stri-ole entire, with base of stria 1 sometimes vestigial, somewhat shortened or broken into two isolated fragments. Intervals convex, those 7, 5 and 3 merging preapically in succession. USS: 14–16.

Ventral side. Prosternal process rounded in dorsal as well as in lateral view, without apical bead; inclination wide and convex, not laterally beaded. Meso- and metathorax densely and rather coarsely punctate except along middle; abdominal sternites II–IV more finely punctate; propleura from same punctate in inner half to smooth.

Figs 6–11. *Pterostichus*: 6, 9 — *P. tonkinensis*, ♂ from Phia Oac Mt; 7, 10 — *P. austrinus* **sp.n.**, holotype; 8, 11 — *P. laevibasis* **sp.n.**, paratype ♂; 6–8 — dorsal habitus; 9–11 — apices of elytra and abdomen, left aspect.

Рис. 6–11. *Pterostichus*: 6, 9 — *P. tonkinensis*, ♂ с горы Phia Oac; 7, 10 — *P. austrinus* **sp.n.**, голотип; 8, 11 — *P. laevibasis* **sp.n.**, паратип ♂; 6–8 — габитус дорзально; 9–11 — вершина надкрылий и брюшка слева.

Legs: *fe*3 slender in female; incrassate three fifths from base, with anteroventral (posteroventral) ridge angulate and posteroventral (posterodorsal) ridge toothed, in male; *ti*1 with two spinules at apex of posterolateral edge and one postero-apical spinule; *ti*3 without lateral setae. Tarsomere 5 glabrous ventrally. Protarsomeres 1–3 dilated and biserially squamose on ventral side in male, simple, with ventro-apical angles toothed, in female.

Aedeagus (Figs 12–13, 22, 30, 43–45): median lobe in lateral view strongly and evenly curved, apex in ventral view lamellate, wide and rounded. Right paramere subtriangular.

Abdominal urites VIII, IX, and reproductive tract in female as in Figs 54–55 and 64–65.

DISTRIBUTION. Known from the type locality only.

NAME. Refers to the elytra glabrous, *i.e.*, without setae other than USS.

HABITATS AND HABITS. All the specimens were hand collected in cloudy forests at 1.950–2.200 m elevation.

Pterostichus (*Morphohaptoderus*) *unisetosus* Fedorenko, **sp.n.**
Figs 2, 14–15, 23, 31, 56–57, 68.

MATERIAL. Holotype ♂ (ZMMU) and two paratypes, ♂, ♀ (SIEE) with label: 'N-Vietnam, 40 km WNW of/ Lao Cai, env. Y Ty, Bat Xat/ Nat[io]n.[al] Park, h=1600-1900 m/ 22°37′-37.6′N/ 103°37.3′-38.3′E, 16-21./ leg. D.Fedorenko X.2018'.

Genitalia examined in all the specimens.

DIAGNOSIS. No significant differences from *P. glabellus* **sp.n.** other than the elytron with middle discal seta, d2, *fe*3 not sexually dimorphic, and aedeagus is distinctive.

DESCRIPTION. Body as in Fig. 2. BL 8.4–8.8 mm. Pronotal base nearly straight, two fifths wider than apex. Elytral stria 7 inside humeral angle; parascutellar striole entire, stria 1 adjoining basal ridge. D2/EL 0.50–0.57 (0.55, n = 3×2). USS: 13–15.

Aedeagus (Figs 14–15, 23, 31): median lobe in lateral view geniculate, apex in ventral view lamellate, triangular. Right paramere oval.

Abdominal urites VIII and IX, with reproductive tract, in female as in Figs 56–57 and 68.

DISTRIBUTION. Only known from the type locality which is on the Hoang Lien [Son] mountain ridge 33 km distant from that of *P. glabellus* **sp.n.**

NAME. Refers to the elytron with single discal seta.

HABITATS AND HABITS. All the specimens were hand collected in a cloudy forest.

Pterostichus (*Morphohaptoderus*) *primitivus* Fedorenko, **sp.n.**
Fig. 3.

MATERIAL. Holotype ♀ (ZMMU) with the label same as for the holotype of *P. glabellus* **sp.n.**

DIAGNOSIS. No significant differences from *P. glabellus* **sp.n.** other than the elytra with parascutellar seta and three discal setae, d1 in stria 3, d2 and d3 in stria 2; *fe*3 not sexually dimorphic.

DESCRIPTION. Body as in Fig. 3, BL 9 mm. Labrum without median impression. Pronotum broadest two fifths from apex, with base nearly straight and a third wider than apex. Elytra with humeral toothed a bit larger. Striae subpunctate, stria 7 inside humeral angle; parascutellar striole entire, stria 1 adjoining parascutellar seta. D1/EL 0.25, D2/EL 0.55, D3/EL 0.77. USS: 13–15. Propleura impunctate.

Gonopode IX slightly larger, gonocoxite more elongated toward apex, with ensiform setae inserted close to base.

DISTRIBUTION. Known from the type locality only.

NAME. Refers to the complete setation of the elytra, which seems to be primary, plesiomorphic, primitive for at least the three species described here.

HABITATS AND HABITS. Holotype was hand collected in a habitat similar to that of *P. glabellus* **sp.n.**

Pterostichus (*Circinatus*) *tonkinensis* Straneo, 1980
Figs 6, 9, 16–17, 24, 32, 35–36, 47.

MATERIAL. Paratype ♀ (MSNM; digital images), with labels: 'Tonkin/ Montes Mauson [Mau Son]/ April,Mai 2-3000′/ H.Fruhstorfer', red printed, combined with handwritten text 'Allotypus/ *tonkinen*/ *sis* Stran.', '*Pterostichus*/ *tonkinensis* n.sp./ det. S. L. Straneo 1977/ *Allotypus*', 'From/ *Berlin*/ Mus.', 'Gift for/ *1977*/ determ.'; 2♂♂ (ZMMU): Vietnam, 40 km W of Cao Bang, Phia Oac Mt., 22°36′50′′N 105°52′0′′E, h~1800 m, deciduous bamboo forest, 3–11.X.2018 (D. Fedorenko).

DIAGNOSIS. This new species is recognizable among all the consubgeners by a very slight constriction between pro- and mesothorax so that the pronotum and the elytra are subequally wide (*vs*. narrow) at their bases, the pronotum thus being subquadrate (*vs*. circular to oval), and the elytra being subparallel-sided. The most similar species, *P. caobang* Fedorenko, 2019, is distinctive in having *fe*3 bisetose, *tr*3 seta vestigial, and the body appearance characteristic of the subgenus.

REDESCRIPTION. With characters of the subgenus [Allegro, Sciaky, 2010; Shi, Liang, 2015; Fedorenko, 2019]. Body (Fig. 6) apterous and rather small, BL 10.5–10.6 mm, shiny black and iridescent. Extreme lateral margin of pronotum reddish, more widely so at basal angles. Antennae, palps, extreme femoral apices, and tarsi red. Dorsal microsculpture isodiametric and distinct on head, hardly traceable on pronotum and elytra, consisting of very small, moderately transverse meshes or very dense transverse lines, respectively.

Head very small, without neck constriction. Eyes convex, genae about a third as long and meeting neck at obtuse angle. Clypeus indistinctly sinuate at apical margin, frons smooth, frontal sulci short, finely and densely punctate at bottom only, parallel and very deep behind straight frontoclypeal suture, then curved toward while not reaching the level of anterior supra-ocular setae, each extended onto clypeus into a fine impressed line, with convexity outward, to adjoin clypeal seta. Labrum rectangular, subsinuate apically, with a shallow round pit at middle of apical half. Mandibular scrobe with longitudinal sulcus. Labial palpomere 3 obliquely truncate and very slightly narrower at apex than preapically. Submentum quadrisetose. Antennae just reaching pronotal base.

Pronotum quadrate, broadest two fifths from apex; sides from subequally rounded all along to nearly straight in basal half, slightly more rounded at basal angles, these slightly obtuse and blunt. Base barely oblique on sides, two fifths wider than apex, moderately punctate at bottom of and a little inside inner basolateral sulci, more sparsely so toward basal angles. Apex nearly truncate, apical angles very slightly acute, a little projecting and slightly blunted. Marginal beads fine and obliterate in middle third of base only. Lateral groove in form of a fine and well impressed line inside lateral bead, finely and densely punctate at bottom and slightly inside in apical four fifths. Inner basolateral sulci in form of deep impressed lines running parallel to each other in basal two fifths, almost reaching base; outer sulci as short and oblique lines hardly traceable between basal and lateral margins. Median line fine, deep, indistinctly crenulate. Basal and apical transverse impressions indistinct. Disc smooth, sublateral line inside lateral groove missing or vague.

Elytra very convex, oval, broadest at about middle, rounded toward humeri and in apical half, nearly straight in between;

Figs 12–21. Aedeagus median lobe: 12–13 — *Pterostichus glabellus* **sp.n.**; 14–15 — *P. unisetosus* **sp.n.**; 16–17 — *P. tonkinensis*; 18–19 — *P. austrinus* **sp.n.**; 20–21 — *P. subirideus* **sp.n.**; 12, 14, 16, 18, 20 — left lateral aspect; 13, 15, 17, 19, 21 — right lateral aspect. Scale bars 1 mm.

Рис. 12–21. Средняя доля эдеагуса: 12–13 — *Pterostichus glabellus* **sp.n.**; 14–15 — *P. unisetosus* **sp.n.**; 16–17 — *P. tonkinensis*; 18–19 — *P. austrinus* **sp.n.**; 20–21 — *P. subirideus* **sp.n.**; 12, 14, 16, 18, 20 — слева; 13, 15, 17, 19, 21 — справа. Масштаб 1 мм.

apices rounded combined; preapical sinuation rather shallow, plica distinct in lateral view. Base slightly oblique, humeri with a distinct tooth; basal ridge transverse and nearly straight, humeral angle obtuse. Striae deep, minutely punctate at bottom, stria 9 finely punctate, those 1–6 adjoining basal ridge, stria 2 adjoining parascutellar seta; parascutellar striole missing (*i.e.*, substituted for obliterate primary base of stria 1). Intervals convex, very so toward apex, intervals 7, 5 and 3 confluent apicad in succession separate from intervals 2 and 8. This latter narrow and costate at base and at apex. Reflexed lateral margin narrow, without additional carinae. Interval 3 with single discal seta, d2, adjoining stria 2 just behind middle, stria 7 with two preapical setae. USS: 6–1–9 or 6–1–8, US8 at about middle.

Ventral side: propleura, as well as meso- and metathorax except medially, with coarse and dense punctation, abdominal sternites II–VI more finely and rather densely punctate along sides. Prosternum without median groove; prosternal process apically truncate, not beaded, in lateral view subrectangular and blunt; inclination wide and concave, with sides edged. Metepisternum short, est3L/W 0.87. Abdominal lateral bead entire. Male sternite VII (Fig. 9) with a pair of small paramedian tubercles, a shallow transverse impression in between and two apical setae 1/3 sternite length distant from apex.

Legs: *fe*3 unisetose due to distal seta missing; tarsomere 5 glabrous ventrally.

Aedeagus (Figs 16–17, 24, 32, 35–36, 47): Median lobe in lateral view strongly curved, nearly geniculate, with an oblong and shallow concavity at middle of right side; apex in dorsal view narrow and slightly curved to the left. Right paramere short triangular. Everted and inflated internal sac curved leftward and ventrad, with two large preapical bulbs, left being larger than right.

DISTRIBUTION. Known from the type locality only.

HABITATS AND HABITS. A forest-dwelling species. The type specimens were collected at ca. 600–900 m and the specimens from the Phia Oac Mt at 1.800 m elevations.

COMMENTS. This species was described based on three specimens, male holotype and two paratypes, male and female, from the Mau Son Mts in Lang Son Province, northern Vietnam. According to the description, the holotype is 11 mm in length (*vs.* 9.2 mm in the female paratype I measured using scale bar). This latter specimen is very slightly different from the examined specimens from the Phia Oac Mt. in having the pronotum barely wider, with base slightly wider (*vs.* narrower) than the elytral bases combined, and the elytral humeral tooth nearly indistinct.

Subgenus ***Neohaptoderus*** Tschitschérine, 1898

Tschitschérine, 1898a: 183 (*Feronia* subg.); Sciaky, 1994: 1; Sciaky, Wrase, 1997: 1091; Shi et al., 2013: 105.

Type species: *Feronia berezowskii* Tschitschérine, 1898, subsequently designated by Lorenz [1998].

DIAGNOSIS. A polytypic subgenus of *Pterostichus* from southern China to northern Vietnam, defined chiefly by the combination of the body apterous, the metepisternum short, *cx*3 bisetose and *tr*3 with seta. Most species also share the pronotum distinctly bisulcate on each side of base, the elytron with 1–2 discal setae (d2 and/or d3) adjoining stria 2, and the tarsomere 5 glabrous ventrally.

Body setation otherwise complete: clypeus bisetose, two supraocular setae, two elytral apical setae in stria 7, *fe*1 posterior face trisetose, *fe*2 with two anteroventral setae in basal three fifths and two anterodorsal setae in apical two fifths, *fe*3 bisetose; *ti*3 toward apex with 1–3 lateral spiniform setae. Tarsomere 5 glabrous ventrally in more than 80% species of the subgenus.

REDESCRIPTION (For recognition only). Body rather medium-sized, BL 7–16 mm. Dorsum shiny black.

Head medium-sized, with neck constriction distinct to imperceptible. Eyes more or less flattened and often rather small, with genae fairly long. Clypeus subsinuate apically, frontoclypeal suture fine and straight, imperceptible on sides. Frontal sulci smooth, usually moderately long, moderately deep and slightly diverging. Antennal scape with preapical seta, pedicel glabrous except for ventral seta and apical verticillate setae, antennomeres 4–11 pubescent. Mentum tooth bifid, submentum quadrisetose. Penultimate labial palpomere bisetose, apical labial and maxillary palpomeres subfusiform.

Pronotum cordate to quadrate or circular, bisetose on each side; these finely beaded. Base with two, well-impressed, basolateral sulci on each side, adjoining along base; inner sulcus separate from lateral groove, rarely absent.

Elytra rather wide at bases, with striae 1–7 or 1–6 inside humeral angle; humeri and humeral tooth distinct, parascutellar seta present, parascutellar striole short to missing. Interval 3 with 1–2 setae, d2 and/or d3; USS: 13–17, sometimes 20–21; US arranged into three groups, anterior (5–7, mostly six, US), intermediate (1–2), and posterior (8–9).

Prosternal process with fine apical bead only (abraded in some older specimens); inclination wide, convex to flat, with margins edged or beaded, or not. Abdominal sternite VII bi- (♂) or quadrisetose (♀) at apex, not or slightly modified into a shallow median concavity in male, sometimes with very fine median carina at bottom; rarely with a small median tubercle.

Legs strong; *ti*1 with anterior face smooth and glabrous; tarsi carinate laterally and sulcate on each side of the carina. Protarsomeres 1–3 dilated, with ventral pad, in male, or strongly toothed at ventro-apical angles in female.

Aedeagus rather typical of the genus, median lobe in lateral view strongly curved to nearly geniculate; apex in dorsal view small triangular to trapezoidal. Right paramere mostly long, arcuate, narrow to very wide, sometimes hooked or moderately long, or short. Everted and inflated internal sac curved to the left and then ventrad and slightly basad; its inner curve mostly with an oblong, more or less sclerotized, concavity to receive a vesicle in form of an oblong sclerite.

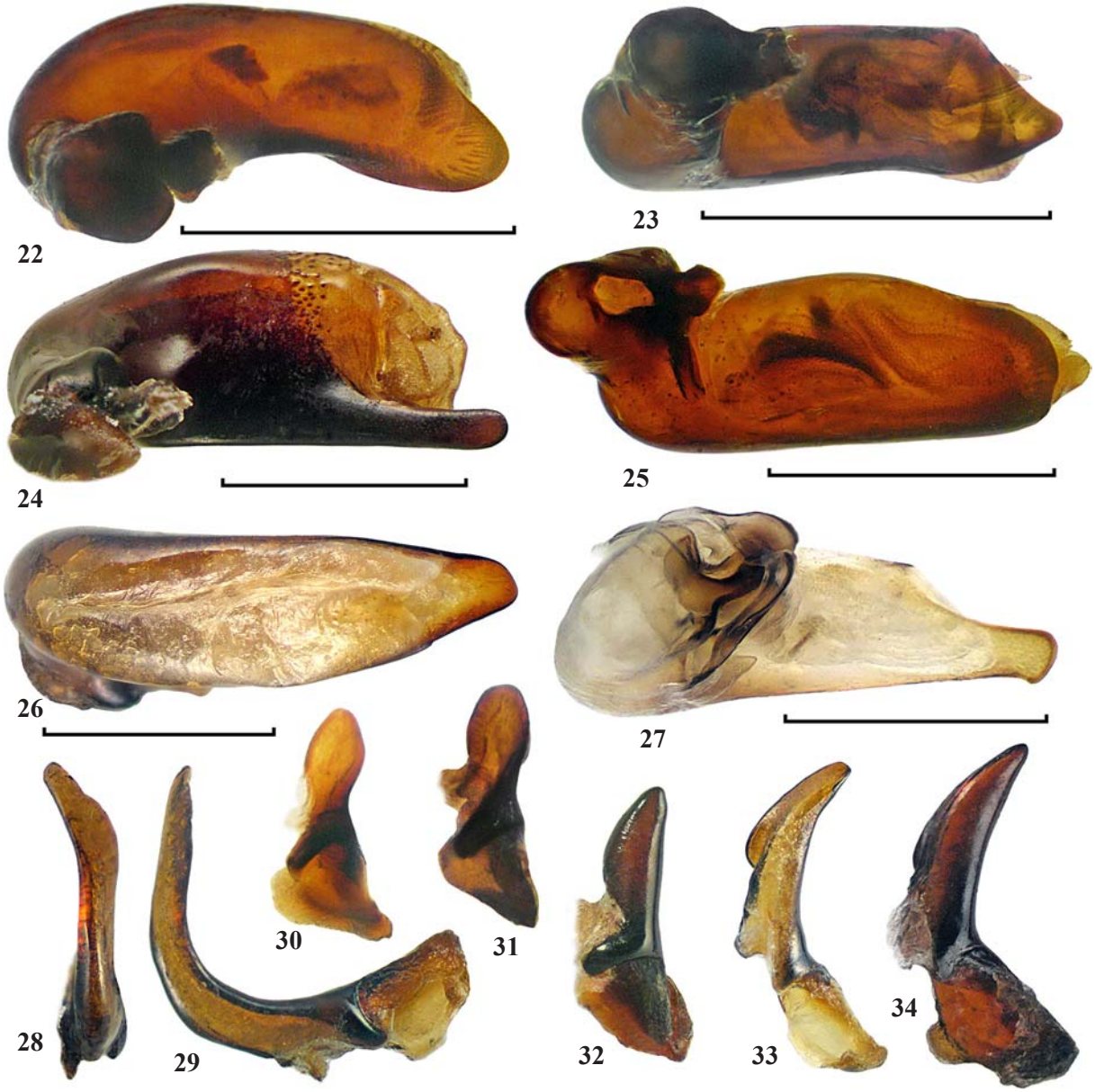
Female tergite VIII fairly wide, rounded at apex; sternite VIII fairly wide, rounded on sides, evenly sclerotized (pigmented), with a small to indistinct, depigmented, latero-apical area; apical pubescence mostly long, dense, absent from sides, medial setae being longer; basolateral apodemes moderately wide, about half as wide at base as long, subtriangular or rectangular, sclerotized same as sternite proper. Tergite IX: laterotergite apically membranous, rounded, densely setose; gonosubcoxite with a row of dense ensiform setae along latero-apical margin. Gonocoxite crescent, with apex pointed, preapical nematiform seta, one inner (d, dorsal) and two outer (v, ventral) ensiform setae. This primary type gonocoxite modified into subtriangular to elliptic one in most species, with apex rounded or blunt, and ensiform setae varying considerably between species, so that 1d+1v, 2d+2v, 2–3d+3–4v combinations occur. Reproductive tract as for *Morphohaptoderus*, except for receptacle curved and seminal canal lacking basal sclerotization while varying much in length.

COMMENTS. This subgenus includes 17 described and many undescribed species from China.

Some significant characters are polythetic within the subgenus. For instance, some species have the right paramere short (*vs*. long in most of the others). Furthermore, *tr*3 seta has been found to be missing in one species while polymor-

phic in another one, *i.e.*, either present (2 ♂♂) or missing (2 ♀♀), or vestigial unilateral (♀). Inner apical setae of the abdominal sternite VII tend to disappear in females of at least two species. One of them is described below and *P.* (*N.*) *szetschuanensis* (Tschitschérine, 1889) has been found to have 1+2 apical setae in one of two female specimens examined.

Sciaky [1994] supposed the closest relationships between *Neohaptoderus* and *Morphohaptoderus*. I do not share this hypothesis because many features combined, especially the short metepisternum (following apterous condition of the body), *cx*3 trisetose, and a peculiar internal sac of aedeagus, suggest rather isolated position of *Morphohaptoderus* within *Pterostichus* lineage D sensu Sasakawa and Kubota [2007]. *Neohaptoderus* may instead be closer to the lineage or lineages defined by the combination of *cx*3 bisetose and *tr*3 with seta, among them *Agastillus* Reitter, 1892; *Haplomaseus* Reitter, 1896; *Oreoplatysma* Jakobson, 1907; and *Asioplatysma* Kryzhanovskij, 1968. Moreover *Sinosteropus* Sciaky, 1994, seems to be the closest ally or only a group of *Neohaptoderus*, since the two taxa share many significant characters, including very similar reproductive tract, genitalia, and pregenital abdominal urites in female. Many other features of *Sinosteropus* such as pronotal basal angles rounded, the outer basolateral sulcus lost, and the parascutellar seta often missing, are by comparison derived characters. Plesiomorphic



Figs 22–34. Aedeagus: 22, 30 — *Pterostichus glabellus* **sp.n.**; 23, 31 — *P. unisetosus* **sp.n.**; 24, 32 — *P. tonkinensis*; 25, 28–29 — *P. austrinus* **sp.n.**; 26, 33 — *P. subirideus* **sp.n.**; 27, 34 — *P. laevibasis* **sp.n.**; 22–26 — median lobe; 28–34 — right paramere, scale as for respective median lobe; 22–25, 27 — ventrobasal aspect; 29–34 — left lateral aspect; 26, 28 — dorsal aspect. Scale bars 1 mm.

Рис. 22–34. Эдеагус: 22, 30 — *Pterostichus glabellus* **sp.n.**; 23, 31 — *P. unisetosus* **sp.n.**; 24, 32 — *P. tonkinensis*; 25, 28–29 — *P. austrinus* **sp.n.**; 26, 33 — *P. subirideus* **sp.n.**; 27, 34 — *P. laevibasis* **sp.n.**; 22–26 — средняя доля; 28–34 — правая парамера в масштабе соответствующей средней доли; 22–25, 27 — вентробазально; 29–34 — слева; 26, 28 — сверху. Масштаб 1 мм.

states of some of these characters could be seen within the *perhoplites*-group that was provisionally assigned to *Sinosteropus* [Schmidt, Tian, 2011]. This group is distinctive in having pronotal basal angles sharp, the parascutellar seta constantly missing, and an undescribed species of this group from China has the pronotum bisulcate on each side.

Pterostichus (*Neohaptoderus*) *austrinus* Fedorenko, **sp.n.**
Figs 7, 10, 18–19, 25, 28–29, 37–38, 46, 52–53, 61, 63.

MATERIAL. Holotype ♂ (ZMMU), labelled: 'N-Vietnam, 40 km W of/ Cao Bang, Phia Oac Mt./ 22°36′25′′N 105°52′08′′E/ h~1650-1700 m,/ deciduous forest, 3-11.X./ leg.D.Fedorenko 2018'. Paratypes (SIEE): 6♂♂, 6♀♀, same data, except for 22°36′30′′N 105°52′20′′E/ h~1600-1650 m; 6♂♂, 5♀♀, same label, except for '…/ 22°36′50′′N 105°52′0′′E/ h~1800 m, deciduous/ ba[m]boo forest, 3-11.X.2018/ leg.D.Fedorenko'.

DIAGNOSIS. The new species is distinctive in having the body rather robust, the pronotum quadrate and impunctate, with two, well-developed, separate basolateral sulci on each side; elytron with two discal setae, d2 and d3, striae deep and very finely punctate, and intervals convex. Besides, apical seta of *fe*1 posterior face mostly missing.

DESCRIPTION. With characters of the subgenus. BL 10.9–12 mm. Body (Fig. 7) apterous, shiny black, elytra slightly iridescent. Tarsi, palps and antennae more or less reddish, elytra slightly reddish at apices. Head and pronotum with a distinct microsculpture consisting of isodiametric or moderately transverse meshes, respectively; elytral microsculpture consisting of very dense transverse lines. Head and pronotum microscopically and rather densely punctate, elytra sparsely and almost indistinctly punctate.

Head with neck constriction shallow and traceable on sides only. Eyes convex, medium-sized, genae about a third as long, meeting neck at obtuse angle. Frons smooth, frontal sulci smooth, moderately deep, diverging, barely surpassing the level of anterior supra-ocular seta, not anteriorly extended onto clypeus. Labrum quadrate. Mandibular scrobe longitudinally sulcate, dorsolateral ridge indistinctly sinuate, dorsal side obliquely striated. Antennae reaching pronotal base.

Pronotum quadrate, broadest just in front of middle; sides slightly rounded and minutely to indistinctly indented just in front of basal angles; these obtuse, with a very blunt, subtle to indistinct, denticle. Base a third wider than apex, subtruncate, slightly sinuate in middle third, and impunctate, with two well-impressed sulci on each side, both not reaching basal margin; inner sulci running on basal two fifth nearly parallel to each other, outer ones about half as long or still shorter; basal bead missing or vestigial and hardly traceable between bases of inner and outer sulci. Apex subtruncate at middle to rather deeply and evenly sinuate between apical angles; these sharp, right or very slightly acute, slightly to distinctly projecting. Marginal beads fine, lateral bead just reaching basal angle, apical bead from entire to obliterate in middle fifth. Lateral groove fine, minutely yet densely punctate at bottom. Disc smooth, except for very superficial rugosities; a fine sublateral line on each side, curved toward mid-length of inner basolateral sulcus and slightly deeper in basal half, running parallel to lateral margin and nearly indistinct in apical half. Median line fine yet distinct, slightly crenulate. Basal and apical transverse impressions indistinct.

Elytra elliptic, broadest at about middle, apices rounded combined, preapical sinuation shallow, with internal plica almost indistinct. Base slightly oblique, humeri toothed; basal ridge transverse and nearly straight, humeral angle subrectangular. Striae deep, very finely punctate, stria 7 mostly opposite humeral angle; parascutellar striole short or very short (*i.e.*, secondary, represented by a vestige of stria 1 that adjoins parascutellar seta while primary parascutellar striole substituted for primary base of stria 1), sometimes missing; parascutellar seta just inside stria 2. Intervals convex, very so toward apex, those 7, 5 and 3 confluent apicad in succession, intervals 7 and 8 subequally wide. Reflexed lateral margin narrow, without additional carinae. Interval 3 with two discal setae in stria 2, d2, just behind middle, D2/EL 0.46–0.60 (0.54, n = 8×2), stria 7 with two preapical setae. USS: 16–18, mostly arranged into a row 6–1–9 or 6-1-1-8.

Underside: Prosternum with a shallow median groove in front of procoxae; prosternal process apically beaded; inclination subconvex, wide, with blunt lateral edges. Sides of metathorax and abdominal sternites II–VI along sides densely, moderately to rather finely, punctate; mesothorax and propleura very shallowly and more sparsely punctate to nearly smooth. Abdominal lateral bead entire. Sternite VII bi- to quadrisetose in female, with setae proximate to apical bead; slightly modified in male (Fig. 10) so that a shallow round impression runs on apical three fifths, with granulate microsculpture and a fine median carina at its bottom; the carina raised medially in form of a small tubercle, being vague before, more distinct behind; two apical setae about 1.5 width of apical bead distant from apical margin.

Legs: *ti*2 with 3–4 lateral setae, *ti*3 with single, preapical, lateral seta; tarsomere 5 glabrous ventrally. Protarsomere 1 sparsely setulose at anterior (inner) margin. Specimens with apical seta of *fe*1 posterior face either present or absent from one or both sides are in the ratio 5 : 5 : 14, respectively.

Aedeagus (Figs 18–19, 25, 28–29, 37–38, 46): Median lobe in lateral view strongly curved, apex in dorsal view rounded, slightly triangular and very short. Right paramere long, narrow, strongly arcuate, apical half being at a slightly acute angle to basal half. Everted and inflated internal sac rather simple, with a small preapical sclerite and a large apical one on left or right side, respectively.

Female urite VIII just as for the genus (Figs 52–53). Tergite IX (Fig. 61) of ground plan structure: gonocoxite crescent, with apex pointed, preapical nematiform seta, one inner and two outer ensiform setae; gonosubcoxite with a few ensiform setae at latero-apical margin. Reproductive tract (Fig. 63): seminal canal fairly short; receptacle more or less c-shaped.

DISTRIBUTION. Known from the type locality only.

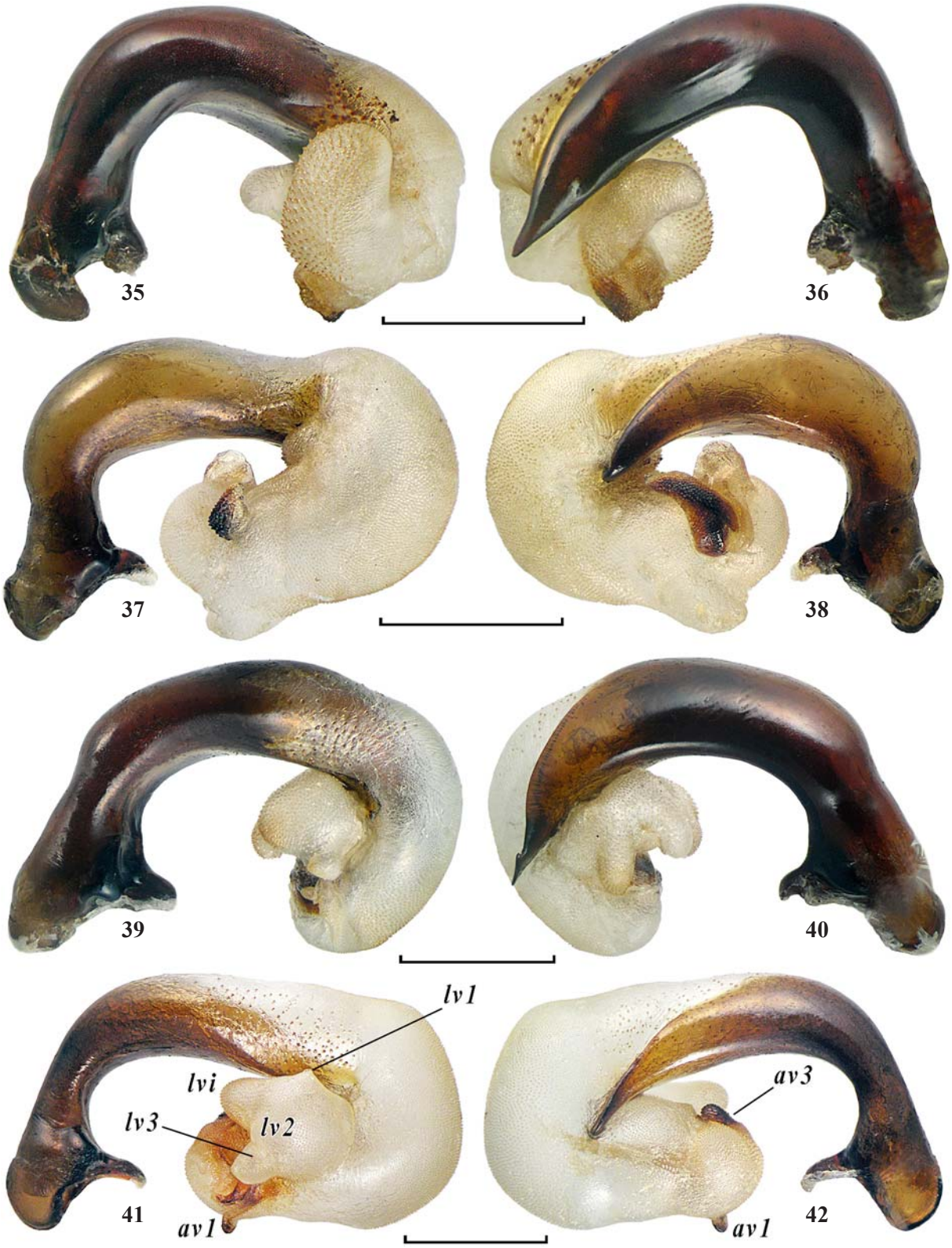
NAME. Refers to the species range, which is southernmost for the subgenus.

HABITATS AND HABITS. Most specimens were collected by pitfall traps in a broad-leaved forest at 1.600 m or in a deciduous and bamboo forest at 1.800 m altitude.

COMMENTS. Individual variations include the anterior elytral seta, d1, additionally present on one or both elytra in four or two specimens, respectively. This species also reveals a tendency for the inner apical setae of the abdominal sternite VII to disappear so that the examined female specimens with two or three, or four setae are in the ratio 3 : 5 : 3, respectively.

Pterostichus (*Vietosteropus*) *subirideus* Fedorenko, **sp.n.**
Figs 4, 20–21, 26, 33, 41–42, 48.

MATERIAL. Holotype ♂ (ZMMU) and five paratypes: 4♂♂, ♀ (SIEE), labelled: 'Vietnam, Ha Tinh Prov[ince]./ Vu Quang nat[io]n[al]. Park,/ Kim Quang env., h~200 m/ 18°17′38′′N 105°22′06′′E/ 24.V-1.VI.2022/ leg.D.Fedorenko'; paratype ♀ (SIEE), with same label, except for h~440 m/ 18°16′26′′N 105°21′41′′E. —



Figs 35–42. Aedeagus with everted and inflated internal sac: 35–36 — *Pterostichus tonkinensis*; 37–38 — *P. austrinus* **sp.n.**; 39–40 — *P. laevibasis* **sp.n.**; 41–42 — *P. subirideus* **sp.n.**; 35, 37, 39, 41 — left lateral aspect; 36, 38, 40, 42 — right lateral aspect; *lv1–3*, *lvi*, *av1*, *av3* — vesicles, termed after Fedorenko [2017]. Scale bars 1 mm.

Рис. 35–42. Эдеагус с вывернутым и раздутым внутренним мешком: 35–36 — *Pterostichus tonkinensis*; 37–38 — *P. austrinus* **sp.n.**; 39–40 — *P. laevibasis* **sp.n.**; 41–42 — *P. subirideus* **sp.n.**; 35, 37, 39, 41 — слева; 36, 38, 40, 42 — справа; *lv1–3*, *lvi*, *av1*, *av3* — пузырьки, терминология по Fedorenko [2017]. Масштаб 1 мм.

The female paratype and a male paratype have damaged body parts as follows: the prothorax and the head or the left propleuron, combined with left antennomeres 9–11 and right antennomeres 6–11 lost, respectively.

Aedeagus examined in four males, internal sac examined in one male.

DIAGNOSIS. With characters of the subgenus [Fedorenko, 2017]. A representative of the *dalatensis* species group, recognizable by the combination of frontal sulci deep and diverging, pronotal lateral bead merged into a widely explanate lateral margin, and *ti*3 with at least single lateral seta (*vs*. none in the other species of this group). Aedeagus, including internal sac and short right paramere, is distinctive, too.

DESCRIPTION. BL 12.3–14.1 mm. Body (Fig. 4) shiny black, pronotum and elytra slightly iridescent; antennae, palps, protibiae and protarsi reddish brown. Dorsal microsculpture very superficial and thence hardly traceable, consisting of isodiametric meshes on head, moderately transverse meshes on pronotum, and very dense transverse lines on elytra; reflexed lateral margin of the latter with very coarse microsculpture, consisting of squamose to nearly granulate, isodiametric or slightly longitudinal meshes.

Eyes large and convex, genae very short and meeting neck at slightly obtuse angle. Clypeus barely sinuate at apical margin, frontoclypeal suture straight. Frons smooth, frontal sulci straight, smooth and deep, strongly diverging, as long as 3/5 distance between frontoclypeal suture and anterior supraocular seta, not extended onto clypeus and abruptly disappearing behind. Labrum rectangular, slightly transverse, slightly sinuate at apical margin. Mandibles smooth dorsally. Submentum quadrisetose.

Pronotum subcircular and rather flat; sides strongly and evenly rounded, broadest just in front of middle. Base truncate, subsinuate at middle; basal angles very obtuse and rounded, almost indistinct; inner basolateral sulci deep, barely diverging basad, running on about basal two fifths, not quite reaching base; outer sulcus in form of C-shaped extension of lateral groove, merging into slightly concave basolateral fovea at a distance from basal margin. Apex evenly sinuate between apical angles; these slightly projecting, right to obtuse and blunt; apical bead obliterate in about middle fourth. Explanate lateral margin flat, not or barely reflexed, moderately wide in front of anterolateral seta, wider behind. Lateral bead missing, lateral groove narrow and deep in apical three quarters, sparsely and finely punctate in apical third to half. Median line fine yet deep, obliterate basally and apically. Basal and apical transverse impressions indistinct. Base very sparsely punctate in basolateral foveae to impunctate, with 2–3 fine punctures at bottom of inner basolateral sulcus only.

Elytra oblong-oval, broadest at about middle, rounded on sides, less so in second to third sixth; humeri rounded; apices slightly separate and blunt; preapical sinuation moderately deep, preapical plica distinct in lateral view. Base rather narrow, humeral tooth indistinct or almost so; basal ridge slightly concave, slightly higher at obtuse humeral angle than at scutellum. Striae deep and impunctate, stria 7 outside humeral angle; parascutellar striole missing. Intervals convex, very so toward apex and toward lateral margin, intervals 7, 5 and 3 merging preapically in succession; intervals 7 and 8 subequally wide. Discal seta d2 slightly behind middle, D2/EL 0.53–0.59 (0.57). Stria 7 with two proximate preapical setae. USS: 17–18, continuous.

Ventral side nearly smooth or mesepisterna moderately punctate, combined with metepisterna and sides of abdominal sternites II–IV sparsely punctate or very so. Prosternal process in dorsal view with apex truncate or slightly concave, without apical bead, in lateral view obtuse and rounded; inclination wide, subconvex, with lateral edges very blunt. Lateral abdominal bead entire. Abdominal sternite VII with setae adjoining this bead in female while about 1/3 sternite length distant from apex in male.

Legs: *fe*3 with single, proximal, seta (one female and one male have either vestigial distal seta or 'setigerous' pores lacking setae, respectively); *ti*3 with 1–2 lateral setae.

Aedeagus (Figs 20–21, 26, 33, 41–42, 48): apex of median lobe lamellate and straight in lateral view, obtrapezoidal and fairly large in dorsal view. Right paramere triangular and short. Everted and inflated internal sac in dorsal view bent ventrad only, with right preapical bulb small and two apical sclerotized vesicles, *av1* and *av3*; left preapical bulb large, with four vesicles, *lv1* very small, *lv2* and *lvi* large, and *lv3* well-developed [for the abbreviations see Fedorenko, 2017].

DISTRIBUTION. Known from the type locality only.

NAME. Refers to a more or less distinct iridescence of the elytra.

HABITATS AND HABITS. All the specimens were hand collected in a montane, tropical, monsoon forest at the lowest altitudes for the subgenus.

Subgenus ***Vietoderus*** Fedorenko, **subg.n.**

Type species: *Pterostichus laevibasis* Fedorenko, **sp.n.**

DIAGNOSIS. A monobasic subgenus of *Pterostichus* different from *Neohaptoderus* in the following points: head rather flat; mandibles smooth dorsally (*vs*. densely obliquely striated); reflexed lateral margin of elytra dull from microsculpture much coarser than that on elytral intervals (*vs*. elytra subequally and superficially microsculptured throughout); humeral tooth nearly indistinct; *ti*3 without (*vs*. with) lateral setae; abdominal sternite VII with apical setae distant from (*vs*. proximate to) apical margin in both sexes; abdominal sternite VII modified into a large median tubercle (*vs*. not or barely modified) in male; right paramere short; aedeagus in lateral view less curved; internal sac with a hypertrophied, transverse, preapical bulb having a few vesicles (*vs*. rather simple, with rather small sclerotized vesicles only). Tergite VIII and sternite VIII wide (long) in female, sternite VIII glabrous apically (Figs 58–59). Spermatheca differentiated.

NAME. An abbreviated combination of Vietnam, the country from where the type species originates, and *Neohaptoderus*, the most similar subgenus of *Pterostichus*.

COMMENTS. In the East Asia, the new subgenus is similar to *Neohaptoderus* and *Rhagadus* Motschulsky, 1866, in having the apically beaded prosternal process, certainly plesiomorphic and rather rare character within *Pterostichus*. The pronotum bisulcate on each side, the elytra without parascutellar striole in some species, and the interval 3 with two discal setae, d1 and d2, are characters the new subgenus shares with *Rhagadus*. However, species of the latter subgenus have the body slenderer, the basolateral foveae punctate, the metepisterna long, and aedeagus peculiar, with right paramere long.

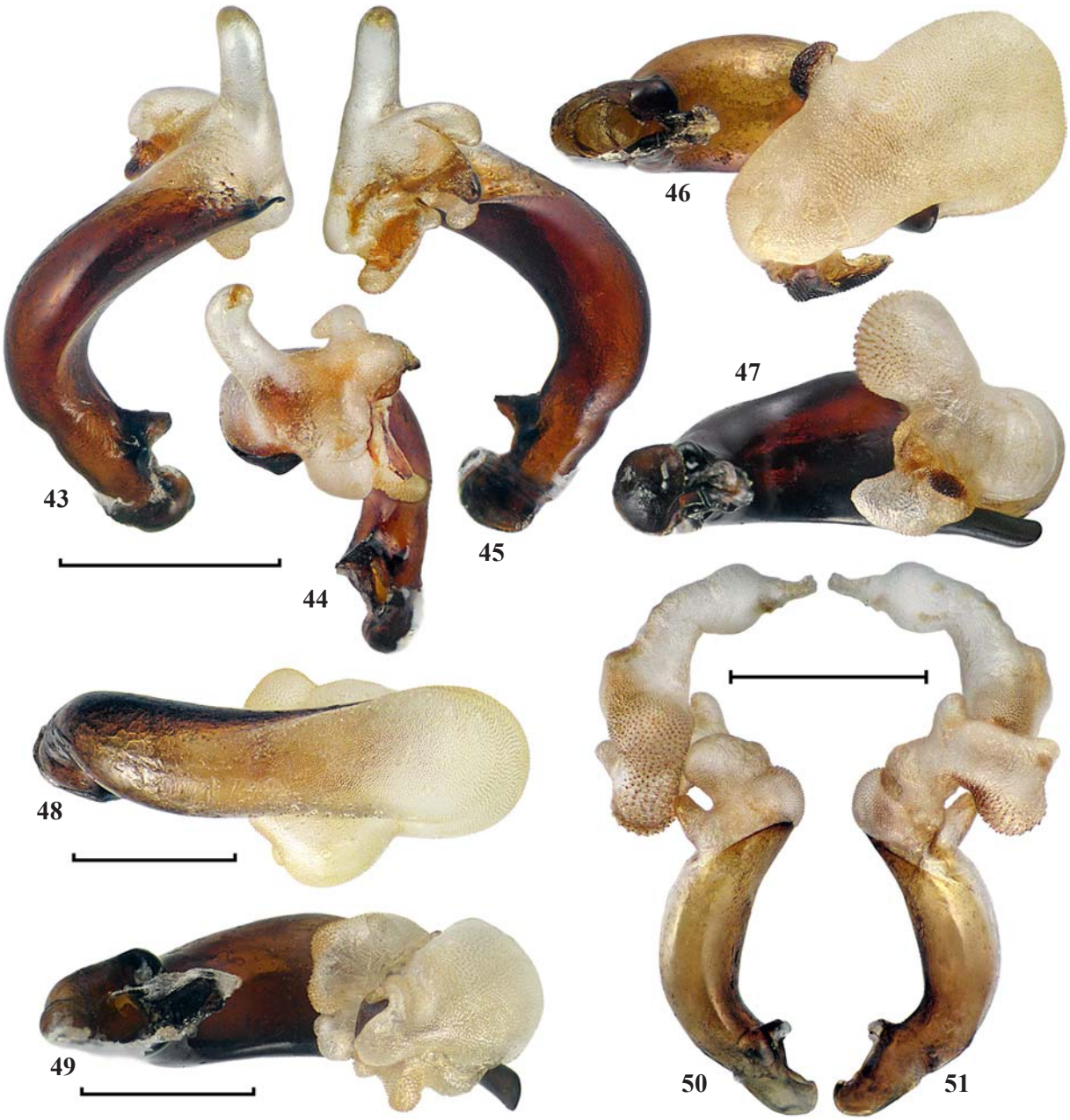
On the other hand, the only known species is more similar to some representatives of the subgenus *Vietosteropus* in appearance, with which it also shares the elytra with coarsely microsculptured reflexed lateral margins, the mandibles smooth dorsally, *ti*3 without lateral setae, and the sternite VIII glabrous apically in female.

Pterostichus (*Vietoderus*) *laevibasis* Fedorenko, **sp.n.**
Figs 8, 11, 27, 34, 39–40, 49, 58–60, 69–70.

MATERIAL. Holotype ♂ (ZMMU), labelled: 'N-Vietnam, 40 km W of/ Cao Bang, Phia Oac Mt./ 3-11.X./ 22°36′50′′N 105°52′0′′E/ h~1800 m, deciduous/ ba[m]boo forest, 3-11.X.2018/ leg.D.Fedorenko'. Paratypes (SIEE): ♀, same data, except for 22°36′25′′N 105°52′08′′E/ h~1650-1700 m,/ deciduous forest, 3-11./ leg.D.Fedorenko 2018'; ♂, same data, except for '…/ Cao Bang, Phia Oac Mt./ E-slope, h=1600-1800 m/ 22°36′27′′N 105°52′0′′E/ 22.V-6.VI.2018/ leg.A.Abramov'.

Aedeagus examined in the holotype (integuments of aedeagus are soft following slightly teneral condition of the specimen); internal sac examined in the male paratype.

DESCRIPTION. With characters of the subgenus. BL 11.3–12.8 mm. Body (Fig. 8) shiny black, pronotum and elytra slightly iridescent; antennae, palps, *ti*1 and tarsi reddish brown, antennae toward apices increasingly pale, red (holotype and female paratype slightly paler coloured, with tarsi red, tibiae reddish brown to red, and reflexed lateral margins of both pronotum and elytra reddish, which is due to somewhat teneral condition; left elytral intervals 1–4 with an occasional, preapical, red patch in the female). Microsculp-



Figs 43–51. Aedeagus with everted and inflated internal sac: 43–45 — *Pterostichus glabellus* **sp.n.**; 46 — *P. austrinus* **sp.n.**; 47 — *P. tonkinensis*; 48 — *P. subirideus* **sp.n.**, dorsal aspect; 49 — *P. laevibasis* **sp.n.**; 50–51 — *P. batdaiensis* **sp.n.**; 43, 50 — left lateral aspect; 44 — apical aspect; 45, 51 — right lateral aspect; 46–47, 49 — ventrobasal aspect. Scale bars 1 mm.

Рис. 43–51. Эдеагус с вывернутым и раздутым внутренним мешком: 43–45 — *Pterostichus glabellus* **sp.n.**; 46 — *P. austrinus* **sp.n.**; 47 — *P. tonkinensis*; 48 — *P. subirideus* **sp.n.**, сверху; 49 — *P. laevibasis* **sp.n.**; 50–51 — *P. batdaiensis* **sp.n.**; 43, 50 — слева; 44 — апикально; 45, 51 — справа; 46–47, 49 — вентробазально. Масштаб 1 мм.

ture isodiametric, superficial yet distinct on head, very superficial on pronotum and elytra, consisting of almost indistinct transverse meshes on the former and very dense transverse lines on the latter; reflexed lateral margin of elytra with very coarse microsculpture, consisting of minute and very dense punctures (apparently formed by isodiametric microgranules fused).

Body otherwise as for *P.* (*Neohaptoderus*) *austrinus* **sp.n.** except the following characters: frons and vertex slightly flattened, neck constriction indistinct, almost so on sides; frontal sulci narrow, more impressed, and shorter, rather abruptly disappearing before the level of anterior supraocular seta.

Pronotum subcircular and rather flat; sides strongly and evenly rounded, broadest just before middle. Base truncate, subsinuate at middle; basal angles very obtuse, blunt or rounded; two basolateral sulci on each side deep, straight, crenulate or with a few fine punctures at bottom, connected by a shallow lateral section of basal bead; inner sulci running parallel to each other on basal two fifths, outher ones about two thirds as long, slightly diverging apicad and slightly separated from lateral grooves; basolateral fovea smooth and flat, barely more convex anteriorly. Apex evenly sinuate between apical angles; these projecting, slightly acute to right, rather sharp or blunted at the very tips; apical bead almost complete, obliterate just medially. Lateral bead fine, lateral groove narrow at apex and at base, slightly broadened in between, as wide as lateral bead at middle, finely and densely punctate in apical three quarters. Median line nearly complete, crenulate, fine yet distinct. Basal and apical transverse impressions indistinct. Each side with a vague sublateral line, indistinct in apical half, very shallow behind and curved toward mid-length of inner basolateral sulcus.

Elytra oblong-oval, nearly parallel-sided in male, slightly more rounded on sides in female, more rounded toward humeri and toward apices; these rounded combined or slightly separate and blunted; preapical sinuation rather shallow, preapical plica traceable in lateral view. Base moderately wide, humeral tooth very minute and invisible in dorsal view; basal ridge straight and transverse, curved laterally to humerus, humeral angle obtuse. Striae deep, finely punctate, those 1–6 or 1–7 inside humeral angle; parascutellar striole very short (short, oblique and almost adjoining stria 1 on left elytron in female paratype). Intervals convex, those 7, 5 and 3 merging preapically in succession; intervals 7 and 8 subequally wide. Discal seta d2 just medial, D2/EL 0.45–0.52 (0.50, n = 3×2). Stria 7 bisetose preapically, with posterior seta adjoining marginal groove (stria 8). USS: 6–1–9.

Ventral side. Propleura finely punctate in inner half, mesepisterna in anterior half, metepisterna and sides of abdominal sternites II–IV moderately and unevenly punctate. Prosternum with indistinct median groove, prosternal process in dorsal view truncate apically, with slight apical bead, in lateral view subrectangular; inclination wide, flat, laterally edged and slightly beaded. Lateral-to-apical abdominal bead entire. Abdominal sternite VII with two apical setae and a large, subtriangular, median tubercle in male (Fig. 11), quadrisetose in female; apical setae in male and inner setae in female about 1/3 sternite length distant from apex.

Legs: tarsomere 5 glabrous ventrally.

Aedeagus (Figs 27, 34, 39–40, 49, 69–70): median lobe in lateral view arcuate; apex in dorsal view fairly long, lamellate, apically rounded, with a small preapical tooth on right side. Right paramere short, triangular, with apex pointed, round or elliptic in cross-section. Everted and inflated internal sac in dorsal view bent to the left and then ventrad, inner curve with six preapical vesicles, which are hypertrophied and merged into a common, large, transverse bulb.

Female urite VIII (Figs 58–59): tergite and sternite wide (long), hemisternite rounded laterally and apically, evenly sclerotized, except for a small, rounded, latero-apical region, basolateral apodemes triangular, wide, slightly longer than wide at bases. Tergite IX (Fig. 60) more or less ground plan; laterotergite rather narrow rounded and setulose at apex; gonocoxite crescent, with apical part elongated, preapical nematiform seta, one inner and two outer ensiform setae in basal two fifths; gonosubcoxite with 2–3, very short, ensiform setae at latero-apical margin. Reproductive tract (Fig. 60): seminal canal at least moderately long (receptacle lost through dissection), with a well-developed basal sclerite and a bulbous structure near its base.

DISTRIBUTION. Known from the type locality only.

NAME. Noun that refers to the smooth base of the pronotum.

HABITATS AND HABITS. All the specimens were collected in cloudy forests.

Subgenus ***Phonias*** Gozis, 1886

Gozis, 1886: 8, type species: *Platysma interstincta* Sturm, 1824 = *P. ovoidea* Sturm, 1824 (by original designation); Bousquet, 1999: 100. — *Biphonias* Jeanne, 1988: 74, type species: *Pterostichus longinquus* Bates 1873. — ? *Biargutor* Novoa, 1979: 93, type species *Pterostichus perisi* Novoa, 1979.

DIAGNOSIS. A subgenus of *Pterostichus*, distinctive from the other subgenera of the *Argutor* lineage (see below) in having characters as follows: body macropterous, with metepisterna long accordingly; prosternal process not apically beaded; *ta*2 and *ta*3 distinctly bisulcate dorsolaterally; elytron with long parascutellar striole, parascutellar seta and 1–3 discal setae; when present, d1 adjoining stria 3, d2 and d3 adjoining or proximate to stria 2; pronotum with two basolateral sulci on each side; these mostly straight to convex toward basal angles.

For details see 'Comments' and key below.

COMMENTS. The *Argutor* lineage was formulated as 'the lineage C', a monophyletic group sister to the remaining *Pterostichus* except *Bothriopterus*, based on results of a molecular study followed by an analysis of morphological evolution of three significant characters such as aedeagus type, spermathecal type, and spermatheca length [Sasakawa, Kubota, 2007]. The species assigned by the authors to their lineage C belonged to all the subgenera listed above but *Pledarus*.

The *Argutor line*age is here considered to include other four subgenera as follows:

— *Argutor* Dejean, 1821: 11, type species: *Carabus vernalis* Panzer, 1796, subsequently designated by Curtis [1837: 32]; Stephens, 1828: 102, et auct. (part.).

— *Badistrinus* Motschulsky 1866: 258, type species: *B. sagax* Motschulsky, 1866 = *Omaseus laticollis* Motschulsky, 1844, subsequently designated by Bousquet [2002]. — *Eurythoracana* Strand, 1936: 168 (= *Eurythorax* Tschitschérine, 1889: 192 [junior homonym], type species: *E. haptoderoides* Tschitschérine, 1889, by monotypy). — *Rhagadulus* Tschitschérine, 1897: 345, type species: *Feronia modicella* Tschitschérine, 1897 (by monotypy).

— *Pledarus* Motschulsky, 1866: 254, type species: *Argutor gibbicollis* Motschulsky, 1844 subsequently designated by Kryzhanovskij et al., 1995.

— *Omaseulus* Lutshnik, 1929: 5 (= *Micromaseus* Casey, 1918: 324 [junior homonym], type species: *Feronia patruelis* Dejean, 1831, by original designation).

This lineage is distinguished from the other *Pterostichus* chiefly by *ti*2 and *ti*3 distinctly sulcate along lateral (outer) margin, combined with distinctive spermatheca and female pregenital segments. Other features include the tarsi sulcate dorsolaterally (on each side), with posterior (inner) sulcus deep to indistinct; basal 1/3–2/5 *ta*1 with a vestigial sulcus on anterior face; dorsum of head more or less distinctly finely punctate; aedeagus median lobe short and wide; right paramere short and rounded in cross-section; everted and inflated internal sac dorsal or frontal in position, without occlusive fold-sclerites round gonopore; metepisterna long. Additional polythetic features include left paramere with rudimentary dorsobasal process, elytral stria 7 weakened to obliterate toward humerus and much more shallow than deepened stria 8. Body primarily macropterous, with setation complete for *Pterostichus*, except for *cx*3 bisetose (inner seta missing).

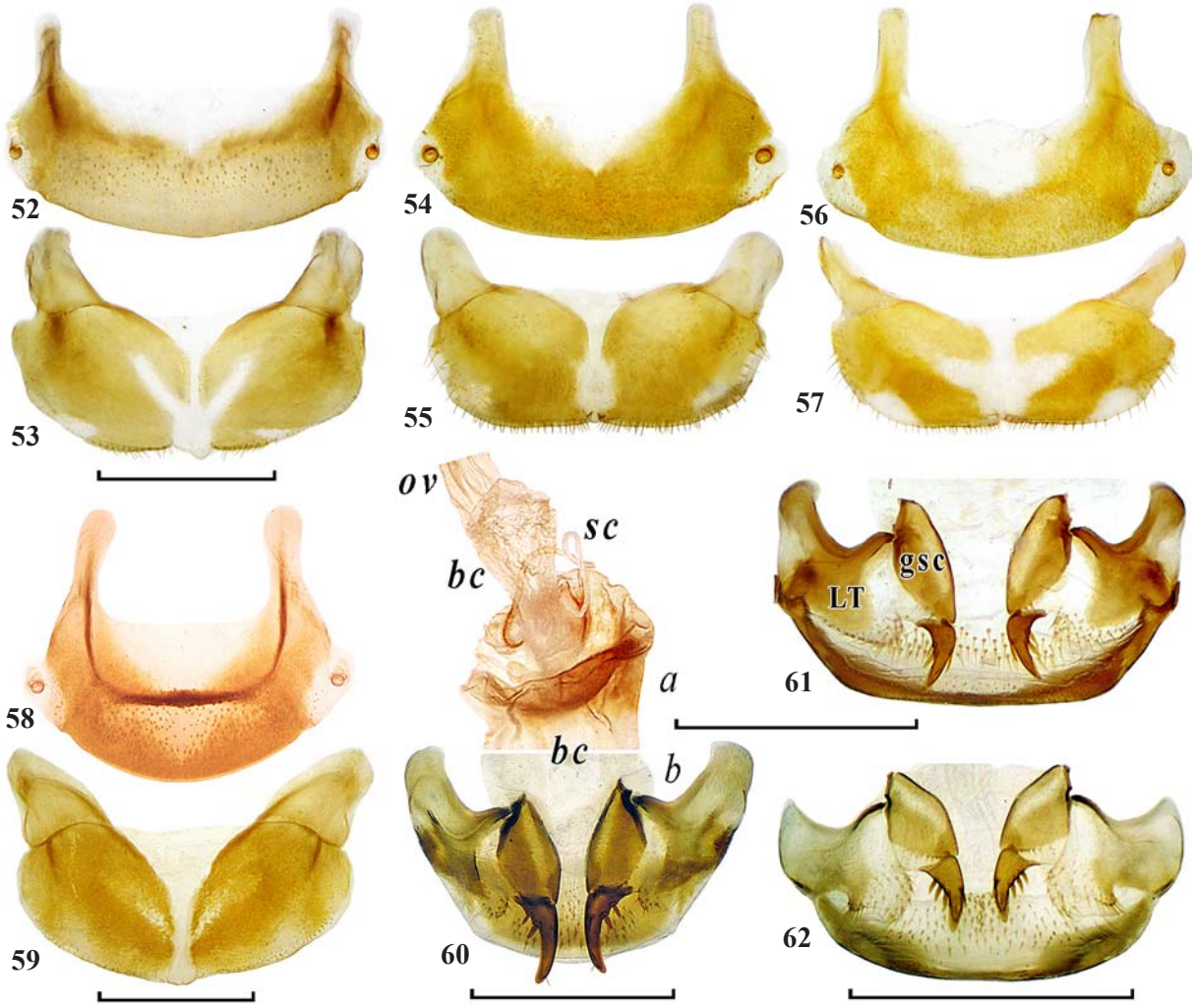
Other characters are as follows:

Body rather small, BL 5–10 mm. Dorsum black, mostly shiny, often iridescent, sometimes rather dull. Head rather small, with eyes convex to flat and neck constriction indistinct. Antennae filiform, moderately long, scape with preapical seta, pedicel with ventral seta, antennomeres 4–11 pubescent. Submentum quadrisetose.

Pronotum convex, cordate to subquadrate, sometimes subcircular; each side finely beaded, primarily with two basolateral sulci inside distinct basal angle. Basolateral fovea punctate between and including basolateral sulci. Apical bead obliterate in middle third; outer basolateral sulci extended inward into longer or shorter sections of basal bead.

Elytra mostly oblong oval, often nearly parallel-sided, moderately wide at bases; humeri and humeral tooth mostly distinct. Interval 3 with 1–3 setae, d1 adjoining stria 3. Stria 7 with two preapical setae, distal seta adjoining lateral groove. USS: 5-1–7 or 6-1–7.

Prosternal process apically beaded (*Argutor*) or not; inclination originally wide at middle, flat or slightly concave, with sides



Figs 52–62. Abdominal urites VIII–IX in female: 52–53, 61 — *Pterostichus austrinus* **sp.n.**; 54–55 — *P. glabellus* **sp.n.**; 56–57 — *P. unisetosus* **sp.n.**; 58–60 — *P. laevibasis* **sp.n.**; 62 — *P. batdaiensis* **sp.n.**; 52, 54, 56, 58 — tergite VIII; 53, 55, 57, 59 — sternite VIII; 60 — urite IX and reproductive tract, dorsal (*a*) and ventral (*b*) aspects; 61–62 — tergite IX, ventral aspect; ***bc*** — *bursa copulatrix*; ***gsc*** — gonosubcoxite; **LT** — laterotergite; ***ov*** — common oviduct; ***sc*** — seminal canal. Scale bars 1 mm.

Рис. 52–62. Уриты VIII–IX брюшка самки: 52–53, 61 — *Pterostichus austrinus* **sp.n.**; 54–55 — *P. glabellus* **sp.n.**; 56–57 — *P. unisetosus* **sp.n.**; 58–60 — *P. laevibasis* **sp.n.**; 62 — *P. batdaiensis* **sp.n.**; 52, 54, 56, 58 — тергит VIII; 53, 55, 57, 59 — стернит VIII; 60 — урит IX и репродуктивный тракт, дорзально (*a*) и вентрально (*b*); 61–62 — тергит IX, вентрально; ***bc*** — копулятивная сумка; ***gsc*** — гоносубкоксит; **LT** — латеротергит; ***ov*** — непарный яйцевод; ***sc*** — семепровод. Масштаб 1 мм.

beaded in dorsal three fifths. Slight modifications that often come from individual variations of a species include the inclination subconvex, with lateral bead vestigial to indistinct (some species of *Argutor* and *Phonias*, most species of *Omaseulus*). *Badistrinus* and *Pledarus* have the inclination (sub)convex, moderately wide or narrow, mostly with no lateral bead.

Abdominal sternite VII bi- (♂) or quadrisetose (♀) at apex, even in sexes.

Legs: *ti*1 anterior face with a faint longitudinal sulcus; it is traceable in, *e.g.*, basal third (*P. ussuriensis* (Tschitschérine, 1897), *P. chameleon* (Motschulsky, 1866)) to two fifths (*P. sulcitarsis* A. Morawitz, 1862, some specimens of *P. longinquus*). Protarsomeres 1–3 with ventroapical angles not toothed in female.

Aedeagus: apex of median lobe very short, wide and rounded, to shortly lamellate; left paramere typical of *Pterostichus*, *i.e.*, quadrate, with very deep dorsobasal fissure and long dorsobasal process (basal apophysis), or more rounded, with dorsobasal fissure fairly shallow and the apophysis short (the other species examined); right paramere short. Everted and inflated internal sac dorsal or apical.

Female tergite VIII and sternite VIII narrow (short), basolateral apodemes of the former very narrow and strongly pigmented, same as or more strongly than the tergite proper (Figs 80–99). Sternite VIII more or less densely setulose along apical margin, butterfly-like due to basolateral apodemes long, as long as or longer than the sternite proper, and strongly sinuate on sides.

Tergite IX (Figs 62, 100). Laterotergite rounded medioapically, with sparse setae, sinuate latero-apically, with a cluster of longer and dense setae just inside latero-apical sinuation. Gonosubcoxite along latero-apical margin with a short row of 3–5 dense setae; these varying in length from moderately long in, *e.g.*, *P. dulcis* (Bates, 1883), through very short to missing in *Badistrinus*, *Pledarus*, and some *Phonias*. Gonocoxite triangular, somewhat crescent, with apex pointed, double preapical nematiform seta, 1–3 outer (ventral) setae and one inner (dorsal) ensiform seta; ensiform setae medium-sized, sometimes reduced in size (*P. stricticollis* Solsky, 1874).

KEY TO SUBGENERA OF THE *ARGUTOR* LINEAGE:

1(10) Elytra with parascutellar seta each, mostly elongated and more or less parallel-sided. Body mostly macropterous; metepisternum long, often much longer than wide. Tarsomere 5 ventrally setose to glabrous.

2(3) Prosternal process apically beaded. Tarsi without or with a median longitudinal sulcus in addition to dorsolateral sulci in *ta*2 and *ta*3, conspicuous anterior and more shallow posterior; *ti*3 with 1–3 lateral setae. Pronotum with single, inner, basolateral sulcus on each side. Elytra with parascutellar striole missing and three (discal) setae, those d2 and d3 adjoining or proximate to stria 2. Spermatheca undifferentiated to nearly differentiated, medium-sized, annulated toward apex; *bursa copulatrix* medium-sized to long. — Holarctic. ..... *Argutor.*

3(2) Prosternal process not apically beaded; *ta*2 and *ta*3 bisulcate dorsolaterally, posterior sulcus ranging from shallow to indistinct. Pronotum mostly bisulcate on each side.

4(5) Elytron with 1–3 discal setae, d2 and/or d3 adjoining stria 2; parascutellar striole long; *ta*2 and *ta*3 mostly with a distinct posterior dorsolateral sulcus; *ti*3 asetose laterally. Female gonosubcoxite IX with 3–4 latero-apical setae. Spermatheca and *bursa copulatrix* medium-sized. — Holarctic. ..... *Phonias.*

5(4) Elytron with 1–3 discal setae adjoining stria 3; parascutellar striole long to missing; *ta*2 and *ta*3 with posterior dorsolateral sulcus vestigial or indistinct. Female gonosubcoxite IX without latero-apical setae.

6(7) Pronotum much wider at base than at apex, PB/PA 1.4–1.6, with lateral margin slightly explanate between fine lateral bead and a distinct sublateral line inside. Elytron with 2–3 discal setae; *ti*3 with 1–3 lateral setae (occasionally absent from one side). *Bursa copulatrix* and, accordingly, internal sac of aedeagus increased much in length (Fig. 100), spermatheca short. — Eastern Palearctic. ... . *Badistrinus.*

7(6) Pronotum convex up to fine lateral bead, rounded on sides, with base less wide relative to apex, PB/PA ~1.3. Elytron with 1–2 discal setae; *ti*3 without or with single lateral seta. *Bursa copulatrix* moderately long.

8(9) Elytron with two discal setae, d2 and d3. Body small, BL 5–5.5 mm; elytra elongated. Spermatheca short. — Eastern Palearctic. ..... ? *Pledarus* (part.).

9(8) Elytron with single discal seta, d3. Body larger, BL 7–9 mm; elytra shorter, sides rounded. Spermatheca long, capitate and corrugated (Fig. 103). — Eastern Palearctic. ..... *Pledarus.*

10(1) Elytra without parascutellar seta, mostly shorter and more rounded on sides. Tarsomere 5 setose or setulose ventrally. Metepisternum shorter; *ta*2 and *ta*3 with posterior dorsolateral sulcus missing or imperceptible on tarsomeres 1–2 only.

11(12) Elytron with single discal seta, d3 adjoining stria 3; parascutellar striole short to missing. Pronotum with a deep fovea between inner and outer basolateral sulcus. Body apterous. ..... *Pledarus* (part.).

12(11) Elytron with three discal setae, d1 adjoining stria 3, d2 and d3 adjoining stria 2; parascutellar striole long. Pronotum more or less cordate, with single, inner, basolateral sulcus on each side; basal angles slightly acute to subrectangular, not toothed. Tarsomere 5 ventrally setose. Body mostly brachypterous to apterous. — Holarctic. .... *Omaseulus.*

Some significant characters vary between species of this lineage considerably, as well as between individuals in some of them. These characters are as follows.

1) Lateral sulci of *ti*2 and *ti*3. — This sulcus is deep and well traceable in *ti*2, while being more shallow in *Omaseulus*. Fine and deep sulcus that runs on at least apical 3/4–4/5 *ti*3 is characteristic of *Argutor* and *Phonias*, but *P. chameleon* and *P. taxonyis* Csiki, 1930 have this sulcus either shallow and shorter or vague, respectively. It is traceable in apical 2/3 tibia in *Badistrinus* and *Pledarus*, while ranging from nearly entire in some specimens of *P. haptoderoides* to hardly traceable in apical 1/3 tibia in *P. neglectus* and some specimens of *P. goschi*. *Omaseulus* have the most reduced *ti*3 sulcus that ranges from shallow in apical 2/3–1/2 (*P. diligens* (Sturm, 1824)) through vague in apical 3/5–1/2 (the other species examined) to nearly indistinct (some specimens of many species) or missing (some specimens of *P. eobius* Tschitschérine, 1899).

These sulci are most likely to be plesiomorphic character state in Pterostichitae, which follows from the fact that pronouncedly sulcate tibiae are peculiar to higher taxa such as, *e.g.*, Abacetina, Cratocerini, Morionini, Panagaeini, etc.

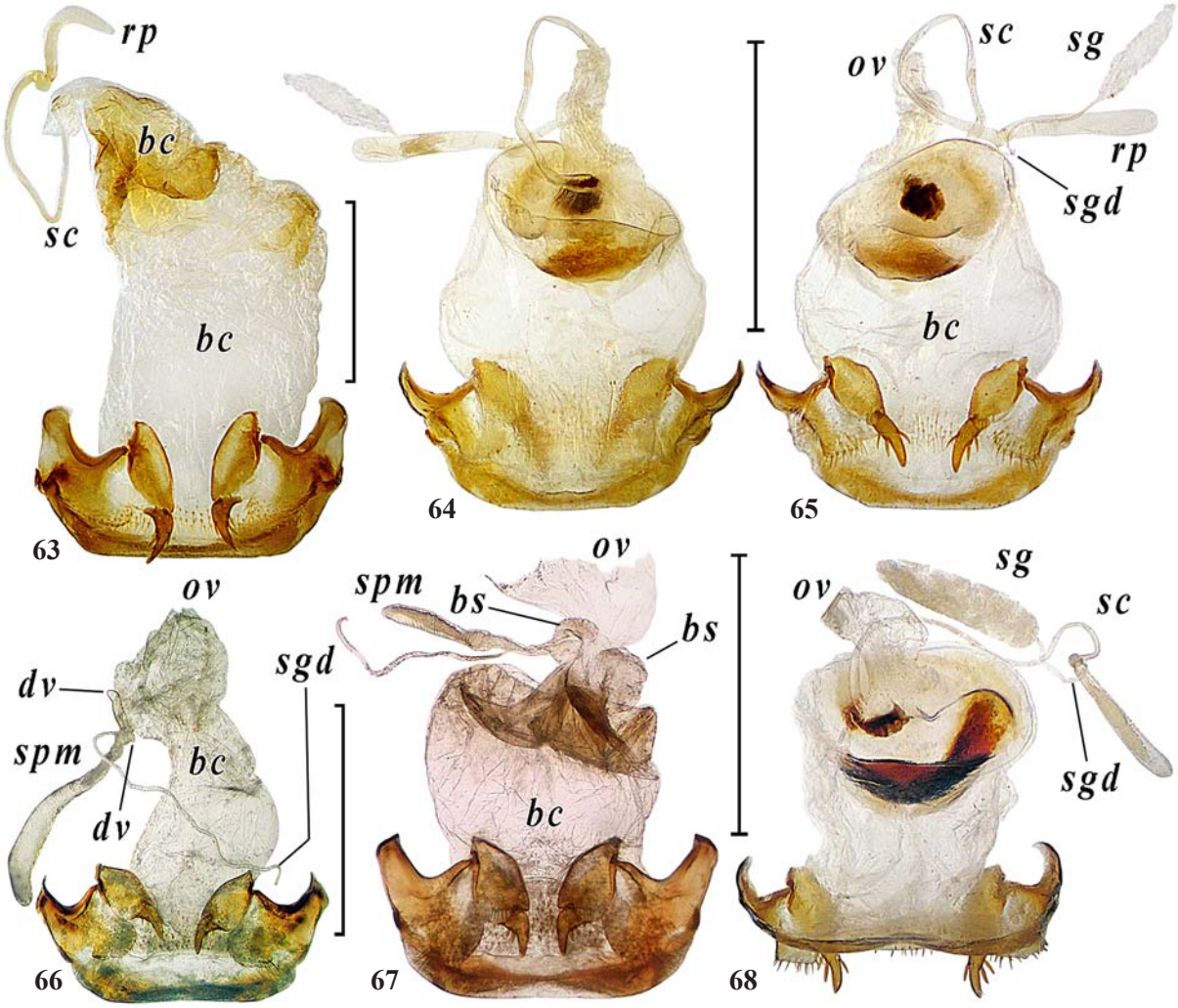
2) Protibia anterior face with a median longitudinal sulcus. — This sulcus is not characteristic of *Pterostichus*, but some species of the *Argutor* lineage have a vestigial sulcus that runs on basal 1/3–2/5 *ti*1. Out of the other species examined, only *P.* (*Falsargutor*) *pseudopedius* Reitter, 1887 was found to have the anterior face of *ti*1 with a fine yet complete sulcus, combined with another special feature, a

row of a few short setae running along the inner margin below the antennal cleaner fissure. This species also has the abdominal sternite VIII and tergite VIII in female rather similar to those seen within the *Argutor* lineage, but spermatheca is differentiated, which is characteristic of the *Pterostichus* lineage D sensu Sasakawa and Kubota [2007].

3) Dorsolateral sulci in *ta*2 and *ta*3. — The tarsi are generally bisulcate within the lineage, the anterior (outer) sulcus being deeper than the posterior (inner) one. This difference is by comparison slight in *Argutor* and *Phonias*, which have the sulci best developed. These are wide, deep and thence conspicuous on tarsomeres 1–4 (*P. dulcis*) or slightly finer in *ta*2 and still more so in *ta*3 (*P. sulcitarsis*, *P. vernalis*), or absent from mesotarsomere 4 (*P. leonisi* Apfelbeck, 1904; some specimens of *P. vernalis*), combined with the posterior sulcus hardly traceable on mesotarsomeres 1 and 2 only (*P. chameleon*). *Phonias* have similar sulci except that the apical two (most species) or 2–3 (*P. stricticollis*) mesotarsomeres are not sulcate, or the mesotarsomeres 1 and 2 and the metatarsomeres 1–3 are only anteriorly sulcate (*P. taxonyis*). *Badistrinus* species are slightly distinctive in having basal three or four tarsomeres anteriorly sulcate, in couple with the posterior sulci being very fine and traceable on basal 2–3 mesotarsomeres and basal four (*P. haptoderoides*) or only 1–2 (*P. laticollis*) metatarsomeres.

Pledarus and *Omaseulus* have the most reduced dorsolateral sulci, especially the posterior ones. Mesotarsomeres 1–2 and metatarsomeres 1–3 mostly have the anterior sulci while the posterior sulci are either missing (many *Omaseulus*) or hardly traceable on basal one or two tarsomeres, mostly metatarsomeres, in *Pledarus* as well as in *P. neglectus*, *P. goschi*, and some *Omaseulus* such as *P. jankowskyi* (Tschitschérine, 1897) or *P. morawitzianus* (Lutshnik, 1922).

4) Ventral setae of tarsomere 5. — The tarsomere is ventrally setose in some species of *Omaseulus* or setulose in some others such as *P. eobius* or *P. morawitzianus* A. Moraw-



Figs 63–68. Reproductive tract in female: 63 — *Pterostichus austrinus* **sp.n.**; 64–65 — *P. glabellus* **sp.n.**; 66 — *P. strenuus* (Panzer, 1796); 67 — *P. chameleon*; 68 — *P. unisetosus* **sp.n.**; 63, 65–67 — ventral aspect; 64, 68 — dorsal aspect; ***bc*** — *bursa copulatrix*; ***bs*** — bulbous structure; ***dv*** — diverticulum; ***ov*** — common oviduct; ***rp*** — receptacle; ***sc*** — seminal canal; ***sg*** — spermathecal gland; ***sgd*** — spermathecal gland duct; ***sp*** — spermatheca. Scale bars 1 mm.

Рис. 63–68. Репродуктивный тракт самки: 63 — *Pterostichus austrinus* **sp.n.**; 64–65 — *P. glabellus* **sp.n.**; 66 — *P. strenuus* (Panzer, 1796); 67 — *P. chameleon*; 68 — *P. unisetosus* **sp.n**; 63, 65–67 — вентрально; 64, 68 — дорзально; ***bc*** — копулятивная сумка; ***bs*** — бульбарное образование; ***dv*** — дивертикул; ***ov*** — непарный яйцевод; ***rp*** — семеприемник; ***sc*** — семепровод; ***sg*** — железа сперматеки; ***sgd*** — проток железы сперматеки; ***sp*** — сперматека. Масштаб 1 мм.

itz, 1862, while it varies from setose to glabrous between species of the other three subgenera. The ventral setae are reduced considerably in size yet still distinct in *P. sulcitarsis*, but almost imperceptible in *P. kerzhneri* (Lafer, 1983), *P.* (*Phonias*) *lutschniki* Jedlička, 1962 and *P.* (*Ph.*) *longinquus*, from which it follows that the erection of *Biphonias* [Jeanne, 1988] has been mere formality.

5) Pronotal basolateral sulci. — Two, well-developed, sulci on each side are certain to be plesiomorphous character state. It is observed in *Badistrinus*, *Pledarus* and many representatives of *Phonias*, whereas the outer, shorter, sulcus has been reduced to a punctiform vestige or totally in *Argutor*, *Omaseulus* and some species of *Phonias* such as *P. taxonyis*; *P. arrowi* Jedlička, 1936; *P. longinquus*; *P. ripensis* (Motschulsky, 1866), and *P. ussuriensis*, as well as in *P. goschi*.

6) Elytral parascutellar striole and seta. — The striole is entire or long, posteriorly adjoining stria 1 or almost so in *Phonias* and *Omaseulus* while ranging from long to missing within *Badistrinus* and from short to missing within *Pledarus*. The seta is absent from the elytra of *Omaseulus* and *P.* (*Pledarus*) *larisae* Sundukov, 2013 only.

7) Elytral discal setae. — Primary, ground plan, pattern is peculiar to *Argutor*, *Omaseulus* and some *Phonias*. It is defined by the seta d1 adjoining stria 1, combined with the setae d2 and d3 approximate to or adjoining stria 2. Some of these setae vary individually in number to be not seldom either doubled on or absent from one or both sides. The remainder of *Phonias* have only retained either the posterior two setae or but one. The setae d2 and d3 also range between stria 2 and middle of interval 3 individually, albeit occasionally, in a species, and variations of such a kind are certain to have given rise to the setation characteristic of *Badistrinus* first and a reduced setation of *Pledarus* after. The setae adjoining stria 3 are characteristic of these two subgenera, which also is true of *P. perisi* placed by Bousquet [1999] within *Phonias*.

8) Female reproductive tract.

(1) *Bursa copulatrix* (*bc*). — When folded it is obtrapezoidal, broader before than behind, with apex invaginate and slightly sclerotized, which is characteristic of not only *Pterostichus* but also many other carabids. This primary *bursa copulatrix* (*bc*1) tends to be increasingly elongated in some representatives. It has become telescoped, with intercalary section (*bc*2) having appeared to mediate between *bc*1 and an elongated apical part (*P. vernalis*), or has evolved into a very long tube which correlates to the internal sac of aedeagus in width (*P. laticollis*, *P. haptoderoides*).

Basal sclerite of the seminal canal or bulbous structures as the bodies of probable sphincters at the oviduct-bursal junction have been found in no species of the lineage but *P. chameleon*. It has one bulb round the basal diverticulum and the other, larger, one at this junction (Fig. 67). These bulbous structures are characteristic of many *Pterostichus* lineage D sensu Sasakawa and Kubota [2007] except *Platysma* Bonelli, 1810, with its allies or derivatives such as, *e.g.*, *Adelosia* Stephens, 1835; *Plectes* Fischer-Waldheim, 1822; *Myosodus* Fischer-Waldheim, 1823; *Metallophilus* Chaudoir, 1838; and *Sinoreophilus* Sciaky, 1996.

(2) Spermatheca. — It enters *bc* just near oviduct-bursal junction, widely ranging between undifferentiated and nearly differentiated type as postulated by Bousquet [1999]. It is rather short annulated, more or less fusiform, and mostly has 1–2 minute diverticula toward spermatheca-bursal junction. Both number and position of these diverticula are species-specific characters of slight or no individual variation [Sasakawa, 2004], which point of view I incline to share. For instance, there are two diverticula on either side of the gland duct-spermathecal junction, the proximal one being closer to this junction (*P. defossus*) or adjoining *bc* (Fig. 66). When single diverticulum is present it either adjoins *bc* (*P. sulcitarsis*, *P. chameleon*) or is situated between the gland duct-spermathecal junction and the spermatheca-bursal one (*P. lutschniki*; *P. laticollis*; *P. haptoderoides* — Fig. 100), or it has given rise to the spermathecal gland duct (*P. usuriensis*). Other species examined either have no distinct deverticula (*P. vernalis*, *P. dulcis*) or, in contrast, have three ones. At least distal two of them are large and thence similar to underdeveloped spermathecae that begin on the gland duct-spermathecal junction (Figs 101–102).

This junction also varies considerably in position from species to species. It mostly ranges within basal 1/3 spermatheca, while sometimes driving closer to its middle (*P. sulcitarsis*, *P. lutschniki*, *P. dulcis*). Variation range of the spermatheca shape and length is much wider. The spermatheca is mostly rather short, subfusiform, more or less c- or s-shaped, about as long as folded *bc* and slightly exceeding this latter in width, broadest in about apical third, with no or not well differentiated receptacle and seminal canal. Rather slight modifications include spermathecae either clavate, more or less enlarged and broadened apicad (*Omaseulus*) or long, slender and slightly wider in apical than in basal half (*P. sulcitarsis*). Profound modification are two, spermatheca either very elongated, tubiform, somewhat corrugated, and capitate apically (Fig. 103) or well-differentiated (*P. lutschniki*, *P. dulcis* — Fig. 104), angled between narrow and elongated seminal canal and shortened and broadened receptacle, except only that the gland duct-spermathecal junction is proximal to (*vs*. just in) the angle.

It follows that the structures such as undifferentiated spermatheca, differentiated spermatheca, with well-developed receptacle and seminal canal, spermathecal diverticula and bulbous structures at the oviduct-bursal junction, occur in these or those members of the *Argutor* lineage, and undifferentiated spermatheca with diverticulum or diverticula dominates over the other patterns. The fact that diverticulum also occurs in *Poecilus* Bonelli, 1810, as a member of the lineage sister to *Pterostichus* [Sasakawa, Kubota, 2007] while the most differentiated spermatheca has only been observed in *P.* (*Argutor*) *dulcis* may suggest that this type spermatheca has step by step evolved from undifferentiated one within the *Argutor* lineage.

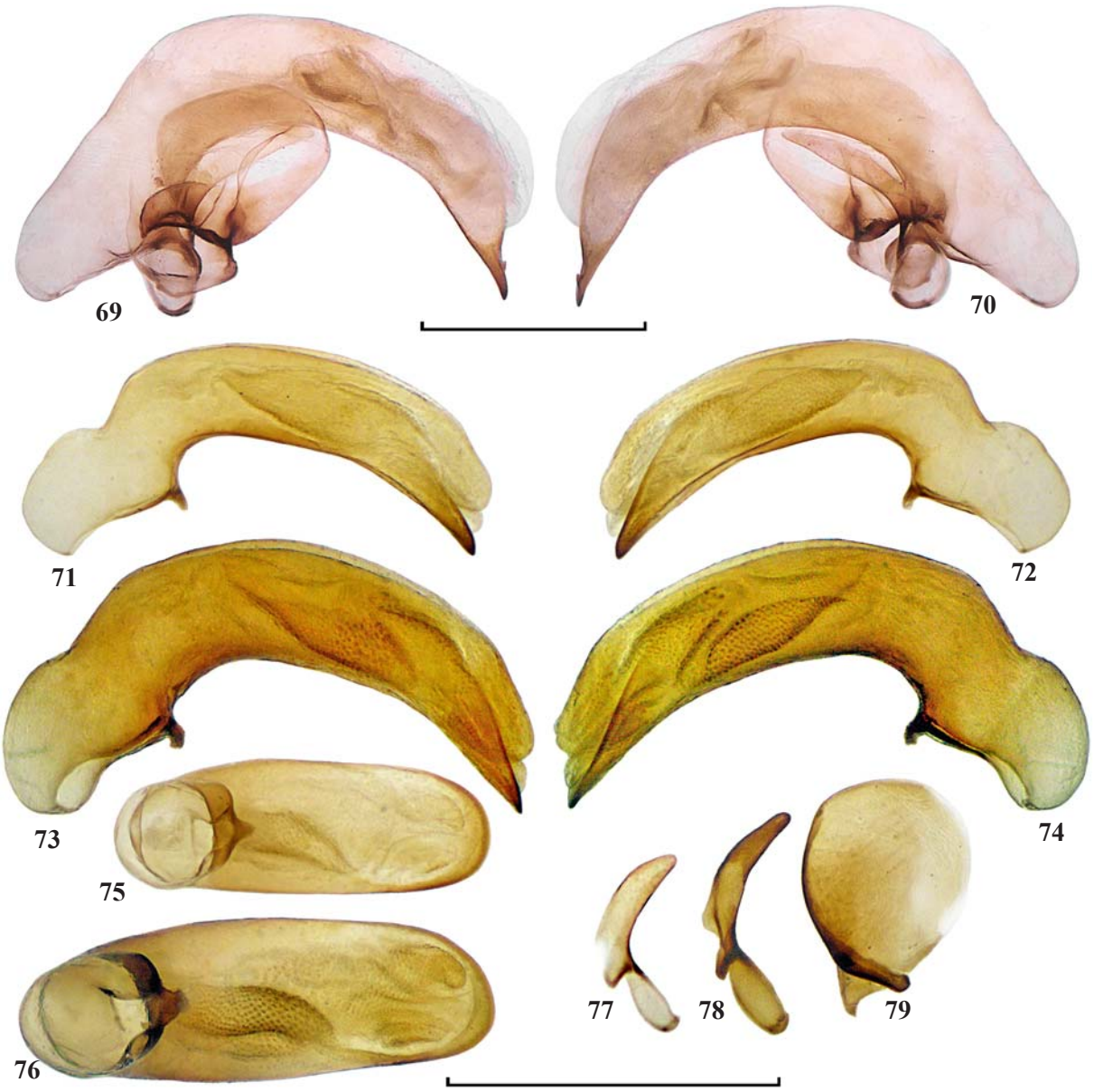
Badistrinus is by comparison the most heterogeneous subgenus of this lineage, whereas it actually includes hardly more than four similar species (*P. laticollis*, *P. haptoderoides*, *P. modicellus*, and *P. kajimurai* Habu et Tanaka, 1957). These all share many characters specified in the key below, including extremely long *bursa copulatrix* and internal sac of aedeagus, certainly interdependent characters. The other species listed under the subgenus [Lorenz, 1998, 2005; Bousquet, 2003, 2017; Makarov, Sundukov, 2022] are different. Smaller sized ones, *P. neglectus* A. Morawitz, 1862 and *P. goschi* Jedlička, 1930, are more similar to *P.* (*Pledarus*) *gibbicollis* with which they share the left paramere quadrate, both *bursa copulatrix* and endophallus shorter, and the pronotum similar in shape. However, the elytral discal setae are reduced to d3 in *Pledarus* and spermatheca is unique in at least *P. gibbicollis*, which may suggest that a separate species group or a subgenus is required for *P. neglectus* with its allies.

In reassessing *Pterostichus* from the Russian Far East Sundukov [2013] briefly reviewed and commented on seven subgenera that shared the *tr*3 with seta, *cx*3 bisetose and long metepisternum, five of these subgenera belonging to the *Argutor* lineage. He transferred *P. longinquus* and allied species

from *Phonias* to its formerly junior synonym, *Biphonias*, and distinguished between the two subgenera chiefly by the elytral parascutellar seta either absent or present, respectively. Yet, this resurrection proved to be invalid since the type species of *Phonias* had the parascutellar seta. Transfer of *P. neglectus* and *P. goschi* from *Badistrinus* to *Biphonias* was also wrong because the two species had the elytral discal setae adjoining stria 3, not stria 2 as was characteristic of *Biphonias*.

The elytral discal setae d2 and d3 that adjoin stria 2 argue for *P. arrowi* and *P. arrowianus* Jedlička, 1938, to be transferred from *Badistrinus* to *Phonias*. This latter subgenus seems to be primitivemost among the others as it is largely defined by plesiomorphous characters: the body macropterous, the pronotum with both inner and outer basolateral sulcus well-developed, the tarsi distinctly bisulcate, the elytral striation and setation complete, *i.e.*, the parascutellar striole long, combined with the parascutellar seta and three discal setae present. Furthermore, *bursa copulatrix* and endophallus are moderate in length and spermatheca seems to be of both shape and structure primary for the lineage as well.

Argutor is nearly the same, but for certain additional symplesiomorphies such as the apically beaded prosternal process and the laterally setose metatibia, combined with a few synapomorphies such as the dorsally trisulcate tarsi, the parascutellar striole missing (modified), and spermatheca differentiated. The remaining subgenera or groups appear to be farther advanced.



Figs 69–79. Aedeagus: 69–70 — *Pterostichus laevibasis* **sp.n.**; 71–79 — *P. batdaiensis* **sp.n.**; 71–72, 75, 77 — paratype from Sa Pa env.; 73–74, 76, 78–79 — paratype from type locality; 69–76 — median lobe; 77–78 — right paramere; 79 — left paramere; 69, 71, 73, 77–78 — left lateral aspect; 70, 72, 74, 79 — right lateral aspect; 75–76 — ventrobasal aspect. Scale bars 1 mm.

Рис. 69–79. Эдеагус: 69–70 — *Pterostichus laevibasis* **sp.n.**; 71–79 — *P. batdaiensis* **sp.n.**; 71–72, 75, 77 — паратип из окрестностей Sa Pa env.; 73–74, 76, 78–79 — паратип из типового местонахождения; 71–76 — средняя доля; 77–78 — правая парамера; 79 — левая парамера; 69, 71, 73, 77–78 — слева; 70, 72, 74, 79 — справа; 75–76 — вентробазально. Масштаб 1 мм.

In sum, the *Argutor* lineage is currently recognized as a monophyletic group [Sasakawa, Kubota, 2007] well distinctive from the other *Pterostichus*. With this circumstance in mind, one could treat it as the separate genus *Argutor* while at least some subgenera it includes seem to be species groups rather than subgenera. On the other hand, some characters observed in *Argutor* and *P.* (*Falsargutor*) *pseudopedius* may argue against this point of view I am decided to share, as they link the *Argutor* lineage with other *Pterostichus* by filling some morphological gaps with themselves.

Pterostichus (*Phonias*) *batdaiensis* Fedorenko, **sp.n.**
Figs 5, 50–51, 62, 71–79, 90–91, 101.

MATERIAL. Holotype (ZMMU) and paratypes (SIEE), 7 ♂♂, 15 ♀♀ (SIEE), labelled: Vietnam, Ha Giang Prov[ince]./ Bat Dai Son Nat[io]n[al]. Park,/ ~6 km NW of Thanh Van,/ 23°07´59´´N 104°56´03´´E/ h~1200 m, picked field, 14-/ leg. D. Fedorenko 22.IV.2022'; ♀, same data except for '…/ Thanh Van env., h~950 m/ 23°06´01´´N 104°58´25´´E/ 14–22.IV.2022/ D. Fedorenko'; ♂ with label: 'N-Vietnam, Lao Cai Prov[ince]./ env. Sa Pa/ near Cat Cat river/ 22.33399°N 103.82281°E/ h = 1320 m 20–23.IV./ A. Prosvirov leg. 2013'.

DIAGNOSIS. Within the subgenus, this species is distinctive in having (1) tarsomere 5 glabrous ventrally, (2) elytron with at least posterior two discal setae, (3) pronotal basal angles distinctly toothed, (4) elytra rather long, and (5) body by comparison larger-sized. The combination of the characters (1) and (5) differentiates the new species from *P. perisi* Novoa, 1979; *P. ripensis*; *P. ussuriensis*; and *P. setipes* (Tschitschérine, 1898). The character (2) serves good to distinguish it from the consubgeners sharing either single elytral discal seta (*P. longinquus*; *P. sasajii* Morita, 2007; *P. lutschniki* Jedlička, 1962; *P. monostigma* (Tschitschérine, 1898); *P. stricticollis*) or complete discal setation (*P. liodactylus* (Tschitschérine, 1898); *P. ovoideus* (Sturm, 1824); *P. taksonyis* Csiki, 1930)). Finally, character (3) separates *P. batdaiensis* **sp.n.** from *P. defossus* Bates, 1883; *P. arrowi* Jedlička, 1936; and *P. arrowianus* Jedlička, 1938. Besides, the latter three species have the elytra either shorter (*P. defossus* and *P. arrowianus*) or with microsculpture consisting of dense transverse lines (*P. arrowi*).

DESCRIPTION. BL 7.7–9.3 mm. Body (Fig. 5) shiny black, elytra with slight to indistinct aeneous lustre; tarsi reddish brown, antennomere 1 and bases of antennomeres 2 and 3 red (most specimens of the type series are somewhat teneral and thence slightly paler in colour, with pronotal lateral bead, sides toward base, and elytra toward apices reddish, ventral side reddish brown, femora dark brown, tibiae and tarsi more or less red). Dorsal microsculpture very superficial, hardly traceable on head and pronotum, slightly more distinct on elytra, consisting of isodiametric, moderately transverse, or moderately to very transverse meshes, respectively. Lateral groove of elytron and ventral side, except for both thorax and abdominal sternites II–IV along middle, dull from coarse and generally isodiametric microsculpture.

Head convex, without neck constriction. Eyes convex, genae short. Frontal sulci shallow, parallel to each other, then diverging and almost reaching anterior supra-ocular setae, anteriorly extended onto clypeus. Frons and vertex finely and densely punctate, with slightly larger punctures inside frontal sulci; clypeus microscopically and densely punctate.

Pronotum subquadrate, broadest just in front of middle; sides evenly rounded, very finely beaded all along, without or with an indistinct trace of sublateral line in basal half. Base truncate, almost a fourth wider than apex, basal angles obtuse, each with a minute rectangular or acute tooth. Basolateral sulci deep, inner straight, running parallel to each other in basal two fifths, obliterated toward basal margin; outer ones half as long, extended into lateral sections of basal bead; these traceable in lateral thirds. Basolateral fovea more or less densely, in part confluently, punctate in and between sulci of one side, with punctate area reaching midway between inner sulcus and median line in some specimens. Apex truncate to evenly concave between apical angles; these sharp, projecting, slightly acute. Median line very fine, superficial, mostly not quite reaching base and apex. Basal and apical transverse impressions vague.

Elytra oblong-oval, broadest slightly behind middle, with apices more or less blunt and rounded combined. Sides almost parallel in male, less so in female, more rounded toward humeri and toward apices than in between; preapical sinuation slight, preapical internal plica narrow yet distinct in lateral view. Base rather narrow, much wider than base of pronotum; humeri mostly marked with a minute tooth. Basal ridge straight and transverse inside stria 4, outwardly curved to humerus, humeral angle right. Striae deep, very finely punctate to impunctate; stria 7 in basal two thirds very fine, much more shallow than others, obliterate toward humeral angle; parascutellar striole long, almost reaching or adjoining stria 1. Intervals nearly flat, convex in front of apex, intervals 7, 5 and 3 confluent apically in succession. Parascutellar setigerous pore adjoining or almost adjoining stria 2 at distance of about one pore diameter from basal ridge. Mostly two discal setae, d2 and d3, present (14 specimens); variations include seta d1 additionally present on one or both elytra (six specimens), or one seta, d2 or d3, either doubled or missing unilaterally, so that either 2+3 or 1+2 setae present (one specimen per pattern described, totally four). USS: mostly 13 (5–1–7) or 14 (6–1–7, in one specimen), with patterns 5–1–7 or 6–7, or, more seldom, 5–8 being formed as a result of the seta US6 varying in position.

Underside. Prosternal process apically rounded or truncate, with widely rounded angles, in lateral view slightly obtuse and blunt; declivity flat, wide and beaded except ventrally. Punctation very shallow so that only mesepisterna are moderately and distinctly punctate, underside otherwise impunctate or very finely and almost indistinctly punctate.

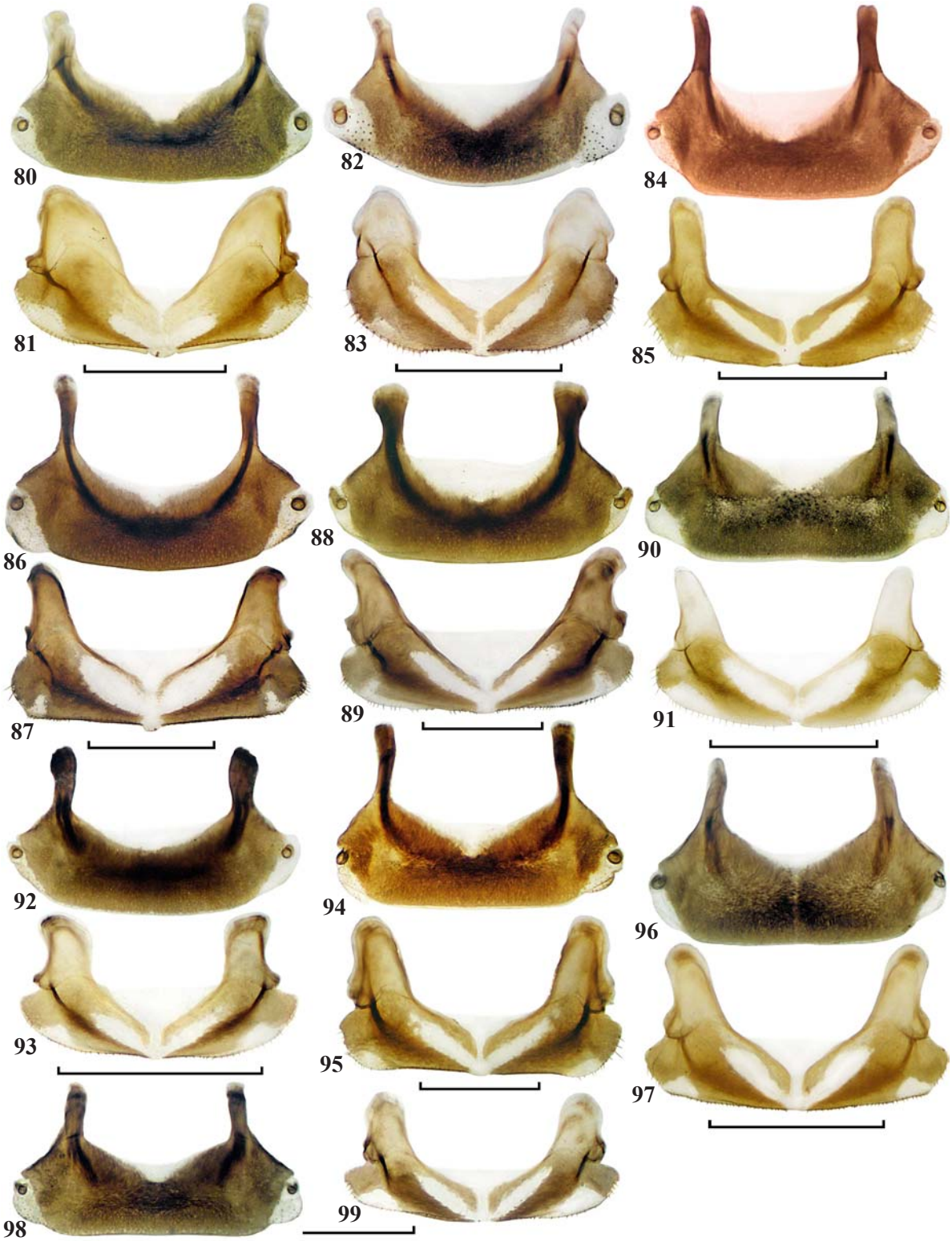
Legs: *ti*2 and *ti*3 deeply outwardly sulcate except at bases, *ti*2 in apical half with 2–3 spiniform lateral setae, *ti*3 asetose laterally; mesotarsomeres 1–3 with deep anterior and finer posterior dorsolateral sulcus above lateral carina, metatarsomeres 1–4 similar, except for posterior sulcus absent from tarsomere 4. Tarsomere 5 glabrous ventrally.

Aedeagus (Figs 71–79): apex of median lobe very short and widely rounded. Left paramere rounded, with both dorsobasal process and dorsobasal fissure nearly indistinct (rudimentary?). Right paramere moderately long and narrow. Everted and inflated internal sac dorsal and more or less tubiform (Figs 50–51).

Female reproductive tract (Fig. 101): *bursa copulatrix* (when folded) trapezoidal, moderate in length. Spermatheca medium-sized, with one diverticulum at base and two long diverticula, additional spermathecae, beginning on gland duct-spermathecal junction about 1/3 spermatheca length distant from its base; the additional spermathecae ranging from a fifth to half as long as spermatheca proper.

DISTRIBUTION. Known to date from two very close localities in Ha Giang Province and another one in Lao Cai Province, northern Vietnam.

HABITATS AND HABITS. All the specimens from the environs of the Bat Dai Son National Park were hand collected in agrocenoses, either a cornfield (one specimen) or a small picked field near small forest stream.



Figs 80–99. Abdominal urite VIII in female: 80–81 — *Pterostichus vernalis*; 82–83 — *P. sulcitarsis*; 84–85 — *P. goschi*; 86–87 — *P. haptoderoides*; 88–89 — *P. gibbicollis*; 90–91 — *P. batdaiensis* **sp.n.**; 92–93 — *P. eobius*; 94–95 — *P. ussuriensis*; 96–97 — *P. stricticollis*; 98–99 — *P. strenuus*; 80, 82, 84, 86, 88, 90, 92, 94, 96, 98 — tergite VIII; 81, 83, 85, 87, 89, 91, 93, 95, 97, 99 — sternite VIII. Scale bars 0.5 (84, 85, 98, 99) or 1 mm.

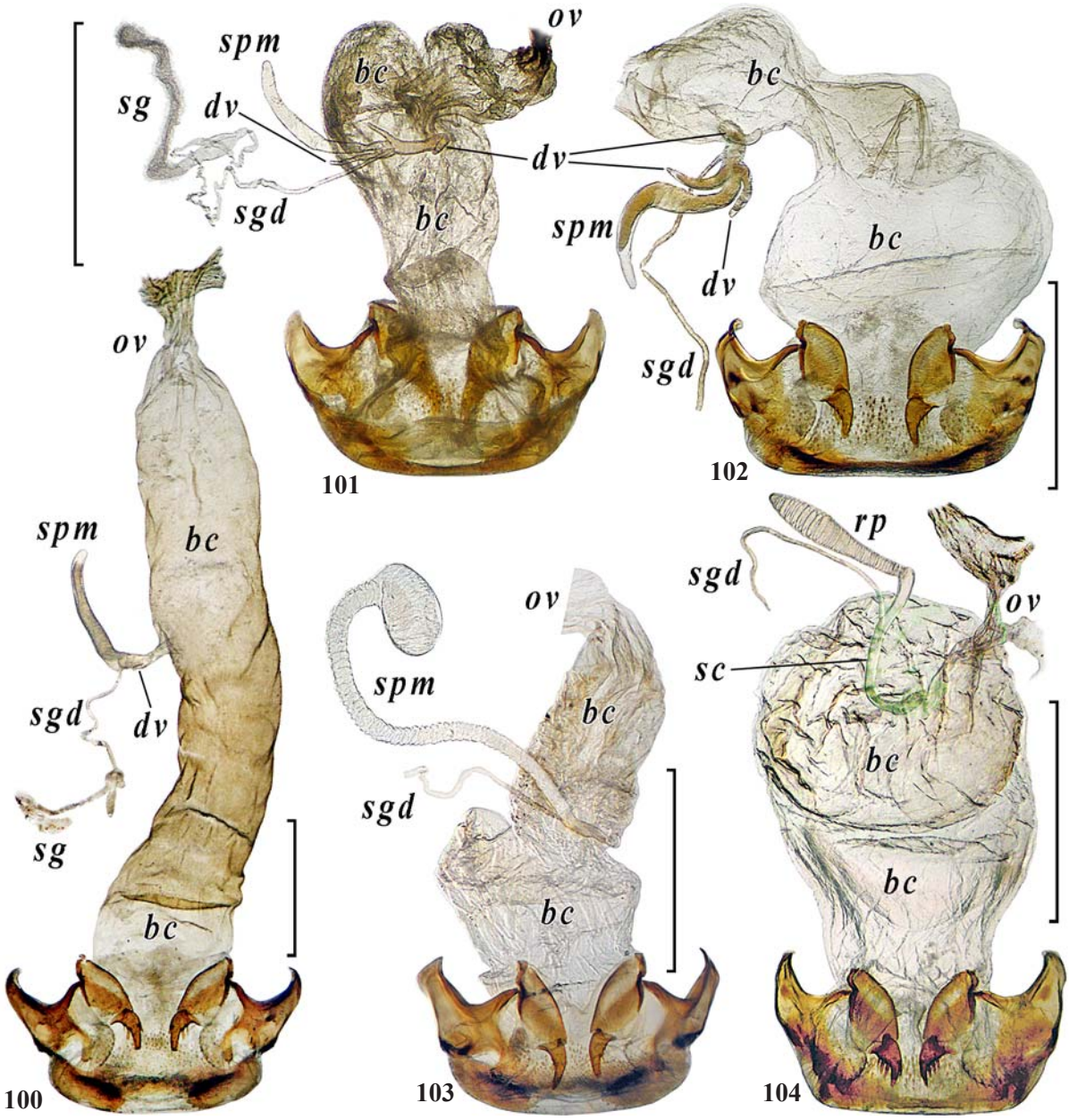
Рис. 80–99. Урит VIII брюшка самки: 80–81 — *Pterostichus vernalis*; 82–83 — *P. sulcitarsis*; 84–85 — *P. goschi*; 86–87 — *P. haptoderoides*; 88–89 — *P. gibbicollis*; 90–91 — *P. batdaiensis* **sp.n.**; 92–93 — *P. eobius*; 94–95 — *P. ussuriensis*; 96–97 — *P. stricticollis*; 98–99 — *P. strenuus*; 80, 82, 84, 86, 88, 90, 92, 94, 96, 98 — тергит VIII; 81, 83, 85, 87, 89, 91, 93, 95, 97, 99 — стернит VIII. Масштаб 0.5 (84, 85, 98, 99) или 1 мм.

NAME. Refers to the Bat Dai Son National Park as the type locality of the new species.

COMMENTS. The new species is most likely to be closely related to *P. stricticollis* with which it shares very similar spermatheca and rather similar, tubiform, internal sac of aedeagus. The latter species otherwise is very different in having the pronotum distinctive, with its outer basolateral sulcus almost adjoining basal angle, apical bead missing, apical angles right and sharp yet strongly bent venrad and thence non-projecting.

New synonymy

Synonymy *P. ussuriensis* (Tschitschérine, 1897) = *P. burkhan* Berlov et Anichtchenko, 2005, **syn.n.**, is here established in passing. It is based on my comparison between two male syntypes of *P. ussuriensis* (ZIN), seven specimens from the southernmost Maritime Province (7.5 km SE of Khasan, 42°24′47′′N 130°44′12′′E, 24–25.V.2022, leg. K. Makarov) and three specimens from SE Transbaikalia (55 km SE of Nizhny Tsasuchei, 2 km N of Zun-Torey Lake, along salt stream, 14.VI.1995, leg. D. Fedorenko). All of them are



Figs 100–104. Reproductive tract in female: 100 — *Pterostichus haptoderoides*; 101 — *P. batdaiensis* **sp.n.**; 102 — *P. stricticollis*; 103 — *P. gibbicollis*; 104 — *P. dulcis*; ***bc*** — *bursa copulatrix*; ***dv*** — diverticulum; ***ov*** — common oviduct; ***rp*** — receptacle; ***sc*** — seminal canal; ***sg*** — spermathecal gland; 63, 65–67 — ventral aspect; 64, 68 — dorsal aspect; ***sgd*** — spermathecal gland duct; ***sp*** — spermatheca. Scale bars 1 mm.

Рис. 100–104. Репродуктивный тракт самки: 100 — *Pterostichus haptoderoides*; 101 — *P. batdaiensis* **sp.n.**; 102 — *P. stricticollis*; 103 — *P. gibbicollis*; 104 — *P. dulcis*; ***bc*** — копулятивная сумка; ***dv*** — дивертикул; ***ov*** — непарный яйцевод; ***rp*** — семеприемник; ***sc*** — семепровод; ***sg*** — железа сперматеки; ***sgd*** — проток железы сперматеки; ***sp*** — сперматека. Масштаб 1 мм.

Table. Body ratios in species of *Pterostichus*.
Таблица. Индексы пропорций тела видов *Pterostichus*.

Species	n	PW/HW	mean	PW/PL	mean	PB/PA	mean	PLw/PL	mean	EW/PW	mean	EL/EW	mean
glabellus **sp.n.**	4♂♂, 4♀♀	1.86–1.89	**1.88**	1.13–1.18	**1.15**	1.38–1.49	**1.46**	0.43–0.48	**0.46**	1.15–1.19	**1.18**	1.46–1.53	**1.49**
	4♂♂									1.15–1.19	**1.17**	1.50–1.51	**1.51**
	4♀♀									1.18–1.19	**1.19**	1.46–1.53	**1.48**
primitivus **sp.n.**	♀	1.72		1.13		1.34		0.42		1.24		1.53	
unisetosus **sp.n.**	2♂♂, ♀	1.76–1.86	**1.82**	1.08–1.17	**1.13**	1.39–1.45	**1.41**	0.45–0.46	**0.45**	1.17–1.23	**1.20**	1.46–1.55	**1.51**
austrinus **sp.n.**	4♂♂, 4♀♀	1.67–1.75	**1.71**	1.34–1.42	**1.37**	1.26–1.37	**1.31**	0.45–0.48	**0.46**	1.10–1.15	**1.12**	1.47–1.53	**1.50**
tonkinensis	PT ♀	1.94		1.32		1.50		0.49		1.12		1.49	
	2♂♂	1.87–1.91	1.89	1.24–1.27	1.26	1.38–1.43	1.41	0.40–0.43	0.42	1.13–1.17	1.15	1.51–1.53	1.52
subirideus **sp.n.**	3♂♂, 2♀♀	1.50–1.61	**1.57**	1.37–1.41	**1.39**			0.42–0.46	**0.44**	1.09–1.14	**1.12**	1.56–1.60	**1.58**
laevibasis **sp.n.**	2♂♂, ♀	1.67–1.70	**1.68**	1.32–1.38	**1.36**	1.04–1.11	**1.08**	0.44–0.48	**0.46**	1.08–1.10	**1.09**	1.57–1.62	**1.59**
batdaiensis **sp.n.**	♂ (Sa Pa)	1.55		1.23		1.27		0.46		1.27		1.61	
	4♂♂, 4♀♀	1.50–1.59	**1.54**	1.15–1.24	**1.18**	1.17–1.27	**1.23**	0.44–0.50	**0.47**	1.26–1.35	**1.31**	1.57–1.63	**1.59**
	4♂♂									1.26–1.33	**1.29**	1.57–1.63	**1.60**
	4♀♀									1.30–1.35	**1.33**	1.57–1.59	**1.58**

similar and match well the descriptions of the species compared in all significant characters, including everted and inflated internal sac of aedeagus examined in the male paratype and four male specimens, two from the Maritime Province and two from Transbaikalia.

Also, synonymy of *P.* (*Argutor*) *dostali* Kirschenhofer, 1981, with *P.* (*A.*) *stricticollis* Solsky, 1874, is very likely. The former was described from the Fergana Valley ('Chamza Abad Fergana' = Hamzaabad = Hamzaobod), yet in no way compared with the latter described from the neighbouring region, the Zeravshan ('Sarafschan') Valley in Uzbekistan, long before. The two species are very similar in all characters, including body size, shape and proportions, and share other features such as the elytron with single discal seta, distinctive dorsal microsculpture, the pronotum peculiar in shape, much narrower at base than the elytral bases combined, etc. Furthermore, aedeagus in dorsal view as figured in Kirschenhofer [1981] is not different from that examined by me in three of eight specimens from Kirghizia (W part of Fergansky Mountain Ridge, S slope, Alashtau Mt Ridge, 18.IV.1992, leg. I. Belousov) or Kazakhstan (Ugamsky Mountain Ridge, NW slope, mid-flow of Boldeberek River, floodland, 20.VI.2004, leg. D. Fedorenko).

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