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**Pages 3 - 9 (2 Color plates) : Alain DRUMONT, Wen-Xuan BI & Claude RIPAILLE**  
**New contribution to the knowledge of the genus *Vietetropis* Komiya, 1997 with the description of a new species from the Guangxi province in southern China (Coleoptera, Cerambycidae, Prioninae, Anacolini)**

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### **Abstract**

The peculiar Prioninae genus *Vietetropis* Komiya, 1997 comprised up to now a single species, *V. viridis*, described at the same time. A new species has been recently found in southern China in the Guangxi province. It is described under the name *V. cheni* sp. nov. and compared to the original type species of the genus *V. viridis*.

### **Résumé**

Le genre particulier de Prioninae *Vietetropis* Komiya, 1997 ne comprenait jusqu'à présent qu'une seule espèce, *V. viridis*, décrite au même moment. Une nouvelle espèce a récemment été découverte dans le sud de la Chine, dans la province du Guangxi. Elle est décrite sous le nom de *V. cheni* sp. nov. et comparée à l'espèce-type du genre *V. viridis*.

### **Key words**

Coleoptera, Cerambycidae, Prioninae, Anacolini, *Vietetropis*, taxonomy, distribution, new species, China, Guangxi.

### **Introduction**

On the basis of specimens collected in the mountainous regions of northern Vietnam, a new Prioninae genus and species, *Vietetropis viridis*, were described by Ziro Komiya in 1997 and integrated in the Anacolini tribe. Since the original description, several specimens of this species were reported or collected from China, Laos and Myanmar and considered as belonging to the same species.

After an accurate observation and comparison between several specimens from these countries and close examination of the holotype of the species *V. viridis*, it appears that if the populations of Vietnam, Laos as well as of Chinese provinces of Xizang and Yunnan do not differ significantly and should be considered as belonging to the same species. On another side, the specimens originating from the Guangxi province in China can be characterized by several morphological differences and are described here under the name: *V. cheni* sp. nov.

### **Collections examined and acronyms used**

- ADC : priv. collection of Alain DRUMONT, Brussels, Belgium.
- AKPC : priv. collection of Anton Olegovich KOZLOV, Moscow, Russia.
- CBWX: priv. collection of Wen-Xuan BI, Shanghai, China.
- CCCC: priv. collection of Chang-Chin CHEN, Tianjin, China.
- CCH: priv. collection Carolus Holzchuh, Villach Austria
- CRC: priv. collection Claude RIPAILLE, Lias, France.
- IZAS: Institute of Zoology, Chinese Academy of Sciences, Beijing, China.
- JDC : priv. collection Jiri DVORACEK, Krenov, Cesky Krumlov, Czech Republic.
- NDC: priv. collection Norbert DELAHAYE, Plaisir, France
- NSMT: National Museum of Nature and Science, Tokyo, Japan.
- RBINS: Royal Belgian Institute of Natural Sciences, Brussels, Belgium.
- TTC : priv. collection Tomas TICHY, Ostrava, Czech Republic.
- ZKC : priv. collection Ziro KOMIYA, Tokyo, Japan.

### ***Vietetropis viridis* Komiya, 1997 (Figs 1a-b, 4a)**

Studied material. – Type material : Holotype ♂, Sapa, N. Vietnam, 25.V.1992 / *Vietetropis viridis* Z. Komiya 1997 (NSMT). Non-type material (32 specimens) : China : 1 ♀, C. Yunnan province, Xinping county, Mt. Ailao-Shan, V.1-11 (ADC); 1 ♂, same province, Menglian, Mt. Daheishan, 2009.V.20-31 (ZKC); 1 ♀, Yunnan, Pingbian, Daweishan, 2000m, 2013.V.13, leg. Chao Li (CCCC); 1 ♂, Tibet-Xizang, Chayu county, Xia Chayu, 2006.VI.22-28 (ZKC). Laos: 1 ♀, Houaphan province, 35 km S. Sam Neua, Ban Saleuey env., 1200-1700m, 2006.V.4-16, leg. M. Pejcha (JDC); 1 ♂, same province, env. Sam Neua, Mt. Phu-Phan, 2060m, 2010.VII, leg. S.(ADC); 1 ♂, same locality, 2014.V.15, leg. S. Collard (NDC); 1 ♀, same locality, 2014.V.25-30, leg. S. Collard (JDC); 1 ♀, same locality, 2014.VI, leg. S. Collard (TTC); 2 ♂♂, 1 ♀, same locality, 2019.IV, leg. S. Collard (ADC); 1 ♂, Xekong province, Dadchung district, Mt Phou Phien Kha Sieng, 2007.V.1-9, leg. local collectors (ADC); 1 ♂, idem (CRC); 2 ♂♂, 2 ♀♀, Xieng Khouang province, Mt. Phou Bia, 2006.V (ZKC). Myanmar : 1 ♂, Kachin province, 2009.V.5-28, leg. local collectors (ADC). Vietnam : 1 ♀, Cao Bang province, Pia Oac, 2001.V (ADC); 1 ♀, same locality, 2001.VI (ADC); 1 ♀, same locality, 2001.X.15, leg. R. Minetti (NDC); 1 ♂, same locality, 2004.V (JDC); 1 ♂, same locality, 2005.VI (ADC); 1 ♀, Tuyen Quang, 1915 (RBINS); 2 ♀♀, Yen Bai province, Mucangchai, 1700m, local collector leg. (ADC); 3 ♂♂, 2 ♀♀, Yen Bai province, env. Yen Bai, 2016.VI, local collectors leg. (JDC).

*Distribution.* – Cambodia(?), China(provinces of Xizang and Yunnan), Laos (provinces of Houaphan, Xekong and Xieng Khouang), Myanmar (province of Kachin), Vietnam (provinces of Cao Bang, Lao Cai, Tuyen Quang and Yen Bai).

*Vietetropis viridis* was described on the basis of several males and females specimens collected from the Sapa Mountains in Lao Cai Province as well as in the mountainous regions of Cao Bang Province in northern Vietnam by KOMIYA (1997). This very peculiar colored Prioninae species has been then reported from Yunnan and Xizang provinces of China by DRUMONT *et al.* (2007). These two provinces records have been also included in DRUMONT & KOMIYA (2010). Additionally, DRUMONT & COLLARD (2010) reported it from Myanmar and Laos. One year later, a known distribution map was published by LIN *et al.* (2011) in which the first female from Guangxi province was reported. This female belongs in fact to the new species *S. cheni* sp. nov.

The species appears to be also present in the north-east of Cambodia (1 ♀, Cambodia, Rattanakiri province, Phumi Kalai Thum, 1-28.VI.2007) but this capture requires confirmation because we could not examine this specimen (DRUMONT & COLLARD, 2010).

### ***Vietetropis cheni* sp. nov. (Figs 2a-c, 3a-c & 4b)**

<http://zoobank.org/urn:lsid:zoobank.org:act:2CD897E5-176A-44DA-82E3-8AF25B28EFA9>

Type material. – Holotype ♂: Jinxiu, Dayaoshan, Louyingou, 1300m, 2018.V.16, local collector leg. (deposited in IZAS). Paratypes: 80 ♂♂; 19 ♀♀: all from China, Guangxi province : 1 ♀, Tianlin, Cenwanglaoshan, 1400m, 2010.VI.19, leg. Yu-Feng Hsu (CCCC) (This female is illustrated at the bottom of the distribution map provided in Lin et al. (2011) and represent the first known specimen of *V. cheni* sp. nov.); 1 ♂, Tianlin, Cenwanglaoshan, 1886m, 2015.VI.7, local collector (CBWX); 1 ♂, Jinxiu, Dayaoshan, 1200m, 2015.V.9, local collector (CCCC); 1 ♀, Jinxiu, Dayaoshan, 1100m, 2015.V.13, local collector (CBWX); 2 ♂♂, Jinxiu, Dayaoshan, 1070m, 2015.V.16, local collector (CBWX); 3 ♂♂, 3 ♀♀, Jinxiu, Pingbancun, 2016.V, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, 1037m, 2016.V.4, local collector (CCCC); 1 ♂, 1 ♀, Jinxiu, Dayaoshan, Louyingou, 1100m, 2016.V.7, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1100m, 2016.V.8, local collector (CCCC); 3 ♂♂, Jinxiu, Dayaoshan, Luoyingou, 1100m, 2016.V.9, local collector (CCH); 3 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1000m, 2016.V.12, local collector (CCCC); 3 ♂♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2016.V.14, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1250m, 2016.V.17, local collector (CCCC); 1 ♂, 1 ♀, Jinxiu, Dayaoshan, Pingbanshan, 1150m, 2016.V.19, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1100m, 2016.V.22, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Sigonglilinchang, 1100m, 2016.V.31, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Wugonglilinchang, 1450m, 2016.VI.3, local collector (CCCC); 1 ♀, Jinxiu, Dayaoshan, Wugonglilinchang, 1560m, 2016.VI.3, local collector (CCCC, will be deposited in IZAS); 1 ♂, Jinxiu, Dayaoshan, Shengtangshan, 1200m, 2016.VI.6, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1100m, 2017.V.11, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Fenzhantun, 1100m, 2017.V.16, local collector (CCCC); 6 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1100m, 2017.V.21, local collector (CCCC); 3 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1150m, 2017.V.22, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Fenzhantun, 900m, 2017.V.23, local collector (CCCC); 1 ♀, Jinxiu, Dayaoshan, Louyingou, 1100m, 2017.V.31, local collector (CCCC); 4 ♂♂, 1 ♀, Jinxiu, Dayaoshan, Fenzhantun, 950m, 2017.VI.1, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2017.VI.2, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Fenzhantun, 1250m, 2017.VI.5, local collector; 1 ♂, Jinxiu, Dayaoshan, Fenzhantun, 1100m, 2017.VI.6, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Laoshanlinchang, 1150m, 2017.VI.15, local collector (CCCC); 3 ♂♂, 2 ♀♀, Jinxiu, Dayaoshan, Fenzhanshan, 1050m, 2018.V.12, local collector (CCCC); 4 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1050m, 2018.V.15, local collector (CCCC); 4 ♂♂, Jinxiu, Dayaoshan, Louyingou, 1300m, 2018.V.16 local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Xinpingshan, 1150m, 2018.V.25, local collector (CCCC); 2 ♂♂, 1 ♀, Jinxiu, Dayaoshan, Louyingou, 1200m, 2018.V.26, local collector (CCCC); 2 ♂♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2018.V.27, local collector (CCCC); 1 ♂, Jinxiu, Dayaoshan, Louyingou, 1300m, 2018.VI.3, local collector

(CCCC); 1 ♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2015.V, local collectors (ADC); 2 ♂♂, 5 ♀♀, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2015.VI, local collectors (ADC); 1 ♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2015.VI, local collectors (CRC); 1 ♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2015.VI, local collectors (ex ADC, will be deposited in RBINS); 5 ♂♂, Jinxiu, Dayaoshan, Pingbanshan, 1100m, 2017.VI, local collector (AKPC).

**Description.** – *Male*: Habitus elongated, head and pronotum green-blue, purple or dark blue with red irisations, antennae black or dark blue, elytra green, purple or blue-green with a satin appearance and a red luster more pronounced on the last two third, significantly wider on the basal part then sub-parallel towards the rounded apex, body dark blue or dark brown, with a velvety appearance and blue luster.

Head strong, sub-cylindrical; vertex, frons and gena finely and densely punctuated; vertex covered with a sparse and white minute pubescence mainly on the rear part, gula covered with a golden seta. Eyes clearly divided in two lobes, lower lobe wider than the seed-shaped upper one, internal border of the upper lobe forming a small carinae with a conical protuberance towards the rear; a small groove starting between antennal tubercles is extended on the vertex by a median shiny line. Antennal tubercles strongly developed, extended down by small carinae along the fronto-genal suture. Mandibles regularly curved on the external edge, with two inner dents and a bifid apex, a strong and punctuated carinae covering the 2/3 of the upper side. Clypeus V-shaped forming an angle in its center, labrum presenting a tuft of golden setae, labial palpus truncated at the apex. Antennae twelve segmented, length slightly exceeding or just reaching the apex of the elytra. Scape very strong, dark blue, irregularly punctuated, highly serrated on the external and internal sides, with a strong spine forming a right angle towards the inside at the apex and extended by an internal fairing. Segment III equal to twice the pronotum height, with a flat and punctuated inner face and small granules, the external side convex, strongly and irregularly denticulated and the apical end furnished with a strong lateral spine downwardly directed. Segments III to V more or less arcuated, segments VI to XI slightly decreasing in length with a beveled process on the outside of the apical end. Relative length of the segments IV to XII compared to the previous one: 0,6 / 0,65 / 0,7 / 0,75 / 0,9 / 0,9 / 0,85 / 0,8 / 0,6.

Pronotum of the same color as the head, barely wider than high, slightly conical, narrowed to the front edge and widening up to two thirds of the height, finely punctuated while maintaining a shiny appearance. Lateral edges V-shaped downwards, with a border which splits backwards to form a spiny projection on posterior angles. Disc slightly depressed with a vertical shiny line.

Scutellum blue-green with red luster, rounded with slight punctuation and shiny appearance, without or with an inconspicuous vertical median line.

Elytra glabrous with a satin aspect, intervals highly rough with strong vermiculation on the basal part and close to the elytral suture with sparse granules, vermiculation decreasing downwards giving a smoother appearance, each elytron furnished with two strong costae thicker on the humeral part and converging near the apex; the two first costae strongly embedded in the humeral zone as if surrounded by a fairing, sutural border stronger in the basal part, a third inconspicuous costae is visible and connect the second one at a short distance from the apex.

Legs dark brown, tibiae straight with two apical spurs at the lower side, pro-tibiae furnished with a short spine at the apex of the outside face, femora robust with pro-femora particularly stocky and strongly curved on the edges.

Underside with prosternum, metasternum, metepisternum and sternites covered by a thin white pubescence and finely punctuated, metepisternum with front edge rounded, lower edge slightly curved with one rounded indentation in the rear part, and the rear edge diagonally oriented with one or two smaller indentations, last sternite strongly indented in the male.

Prosternal process covered with white pubescence and with the apex rounded and spatulated, mesosternal apophysis concave with rounded apex.

*Female*: The female description corresponds to that of the male with the mandibles less strong, the antennal length shorter (roughly the middle of elytra), scape less stocky, lack of apical spine on the third segment, a light-brown or orange coloration of the sternites and the blue or blue-green general coloration more pronounced than in ♂♂ (Figs 3b & c).

*Size (body length measured from the clypeus to the apex of elytra)*. – ♂♂: 21.5–52.1 mm (holotype: 42.5 mm), ♀♀: 22.7–43.1 mm.

*Variability in the paratype series*. – None concerning the body parts and structure, except the ones related to the sex and the length of the specimens. The body color can vary in males from green to purple or blue-green with some red irisations. The metallic green form is relatively rare (about 15% among the 80 males that have been studied), and so we choose to designate a specimen with metallic purple color as holotype.

*Etymology*. – The species name is given in honor of Mr. Chang-Chin CHEN (Tianjin, China) who provided a great part of study material and who obtained in 2010 the first known female of the genus *Vietetropis* coming from the Chinese province of Guangxi that was mentioned in LIN *et al.* (2011).

*Diagnosis and discussion.* – This new species is very close to the single genus species *Vietetropis viridis* Komiya, but can be easily separated from it by the following characters which are mostly visible and most characterized in males:

- The punctuation of the head and pronotum is dense but with flat intervals and a shiny appearance (very dense punctuation on *viridis* with peak intervals giving the impression of a granulation with mat appearance) (Fig. 4);
- The elytral costae are very strong and much thicker in the humeral part and the sutural border is particularly thick and granular on the basal area (costae and sutural border weaker on *viridis*);
- The scutellum is poorly or irregularly punctuated with a shiny appearance (strongly punctuated with a mat appearance on *viridis*);
- The metepisternum has the front edge rounded, the lower edge slightly curved and the rear edge not straight with one or two indentations (edges sub-parallel and almost straight on *viridis*).

*Distribution and ecology.* – So far only known from two districts (Tianlin Xian and Jinxiu Xian) in the Guangxi province in southern China. Regarding ecology, very little information is known; most of the specimens were collected in May and June months during the day time which obviously seems to demonstrate that *V. cheni* can be a diurnal species.

#### *Current composition of the genus Vietetropis.*

**Genus *Vietetropis* Komiya, 1997** (type-species: *Vietetropis viridis* Komiya, 1997)

*V. viridis* Komiya, 1997: Cambodia(?), China(Xizang, Yunnan), Laos (Houaphan, Xekong, Xieng Khouang), Myanmar (Kachin), Vietnam (Cao Bang, Lao Cai, Tuyen Quang, Yen Bai)

*V. cheni* sp. nov. : China (Guangxi)

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We wish to express our sincere thanks to Mr. Chang-Chin CHEN (Tianjin, China) for supporting the second author in the collecting trips and communicating us the invaluable specimens used in the present study. We are indebted to Dr. Shuhei NOMURA from the Department of Zoology in the National Museum of Nature and Science (Tokyo, Japan) for the sending of the holotype of *Vietetropis viridis* to the first author for examination. Our sincere thanks also go to our colleagues and friends Norbert DELAHAYE, Jiri DVORACEK, Ziro KOMIYA, Anton Olegovich KOZLOV & Tomas TICHY for the communication of specimen data present in their collections. We are very grateful to Ms. Florence TRUS (RBINS – Scientific Service Heritage) for the stacked colour photos of the holotype of *Vietetropis viridis*.

### References consulted

- DRUMONT (A.), LI (J.) & KOMIYA (Z.), 2007. – Contribution à l'étude des Prioninae de Chine (Coleoptera, Cerambycidae, Prioninae). *Lambillionea*, 107 (2): 263-269, 8 figs.
- DRUMONT (A.) & COLLARD (S.), 2010. – Nouvelles données de capture pour deux espèces de Prioninae de la tribu des Anacolini (Coleoptera, Cerambycidae, Prioninae). *Les Cahiers Magellanes*, NS 2 : 62-65.
- DRUMONT (A.) & KOMIYA (Z.), 2010. – *Cerambycidae: Prioninae. Catalogue of species* [pp. 86-95] in LÖBL I. & SMETANA A. *Catalogue of Palaearctic Coleoptera, volume 6. Chrysomeloidea*. Löbl I. & Smetana A, Eds, Apollo Books, Stenstrup, Denmark, 924 pp.
- KOMIYA (Z.), 1997. – A new genus and species of the subfamily Prioninae (Coleoptera, Cerambycidae) from Vietnam. *Elytra*, Tokyo, 25 (1): 39-44.
- LIN (M.), DRUMONT (A.) & SALTIN (J.-P.), 2011. – *Vietetropis viridis* Komiya, 1997 newly recorded from Guangxi province in southern China, with a known distribution map (Coleoptera, Cerambycidae, Prioninae, Anacolini). *Lambillionea*, 111 (2): 171-172.

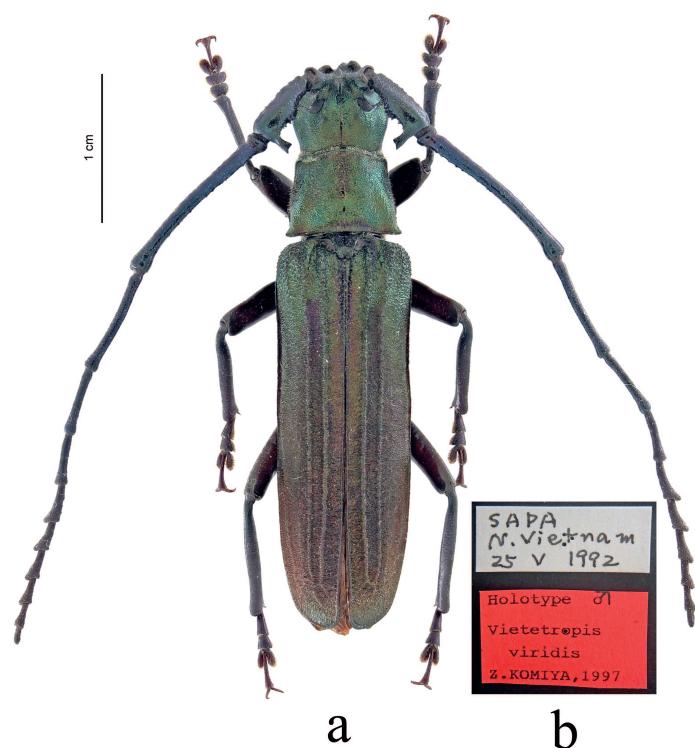
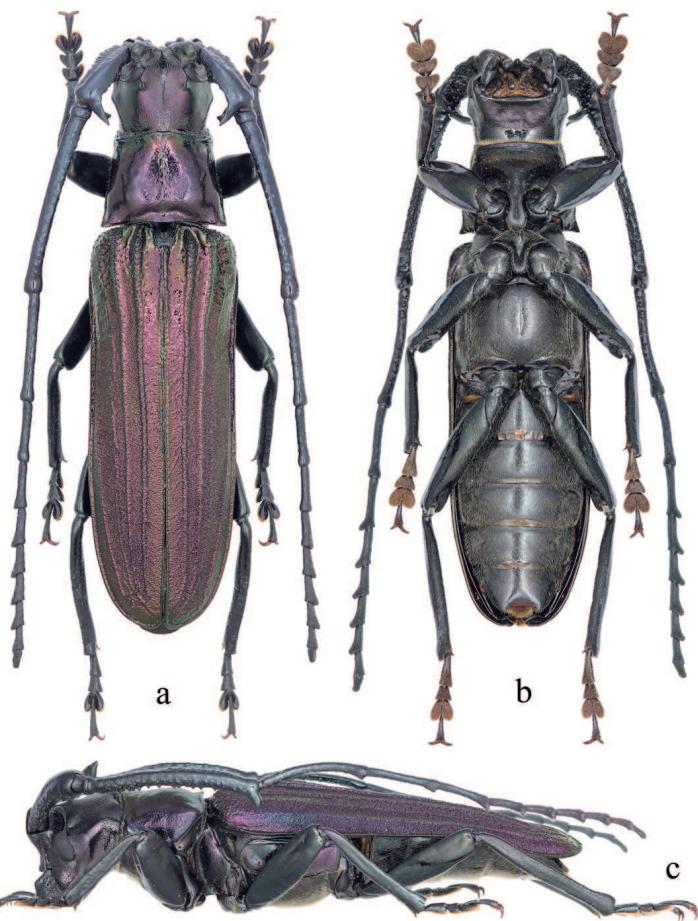
### *Legend of the figures*

**Fig. 1.** *Vietetropis viridis* Komiya, 1997. Holotype ♂ preserved in NSMT, 38.5 mm (length taken from the tip of mandibles to the elytral apex). a. Habitus, dorsal view, b. Labels (Pictures by Florence TRUS).

**Fig. 2.** *Vietetropis cheni* sp. nov. a. Holotype ♂ in IZAS, 42.5 mm (length taken from the tip of mandibles to the elytral apex), habitus, dorsal view; b. Paratype ♂ (China, Guangxi, Jinxiu, Dayaoshan, 1070m, 2015.V.16, in CBWX), purple form, 39.5 mm (length taken from the tip of mandibles to the elytral apex), habitus, ventral view; c. Idem, habitus, lateral view. (Pictures by Wen-Xuan BI).

**Fig. 3.** *V. cheni* sp. nov. a. Paratype ♂ (China, Guangxi, Tianlin, Cenwanglaoshan, 1886m, 2015.VI.7, in CBWX), green form, 27 mm (length taken from the tip of mandibles to the elytral apex), habitus, dorsal view; b. Paratype ♀ (China, Guangxi, Jinxiu, Dayaoshan, 1170m, 2015.V.13, in CBWX), 33.8 mm (length taken from the tip of mandibles to the elytral apex), habitus, dorsal view; c. Idem, habitus, ventral view. (Pictures by Wen-Xuan BI).

**Fig. 4.** Comparison of the basal part of the head and pronotum of *Vietetropis* spp. a. *V. viridis* Komiya, 1997, Holotype ♂ (Picture by Florence TRUS). b. *V. cheni* sp. nov. Paratype ♂ (China, Guangxi, Jinxiu, Dayaoshan, Louyingou, 1300m, 2018.V.16, 35.2 mm, in CBWX). (Picture by Wen-Xuan BI).

**Fig. 1****Fig. 2**

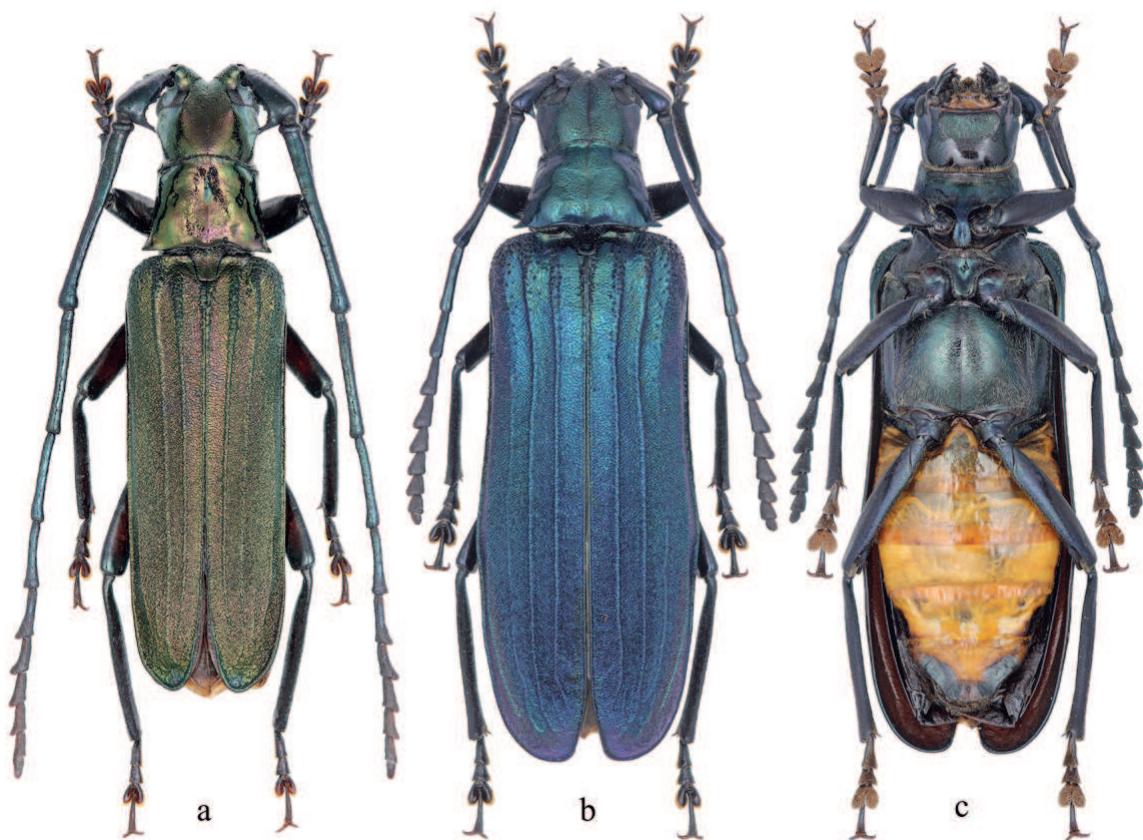


Fig. 3

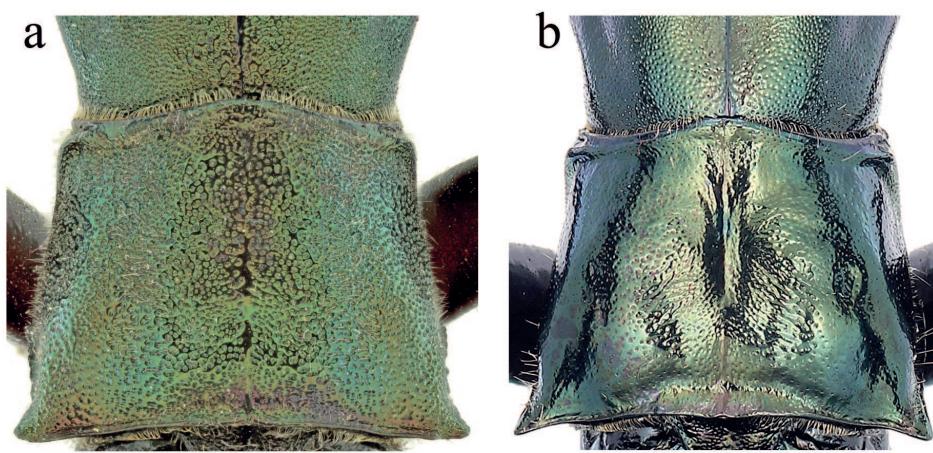


Fig. 4