

## ***Cordulegaster vanbrinkae* Lohmann, 1993 (Odonata: Anisoptera) discovered in Armenia**

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### **Abstract**

On 13 July 2010, in a woodland near the village of Verin Khotanan, Armenia, five males of *Cordulegaster vanbrinkae* were captured. These specimens are documented, compared with the holotype from Iran and discussed in detail. The current protection situation of this species in Armenia is briefly commented. In addition, the locus typicus information of the holotype from Iran is corrected and detailed.

### **Introduction**

*Cordulegaster vanbrinkae* ["*vanbrinki*" in the original description, but see van Tol (1994)] is a poorly known anisopterid dragonfly, described by a single male specimen collected on 23 July 1971 on a woodland brook at c. 7km north of Veysar at c. 1150m a.s.l [c. 36°31'12.15"N / 51°31'12.19" E] in Elburz Mountains, N Iran (Lohmann 1993; detailed by H. Paulus, 15. August 2012; see supplemental Material to this paper in the appendix).

Since then, only the holotype was known and no living animal had been so far identified (Boudot 2006, J.-P. Boudot in litt. 2011). The present report documents the rediscovery of that species in Armenia at c. 550km NW from the locus typicus in Iran.

### **Circumstances of observation**

In summer 2010 VA with colleagues conducted bird and butterfly surveys in the Syunik Province, southern Armenia. On 13 July 2010, in a woodland near the village of

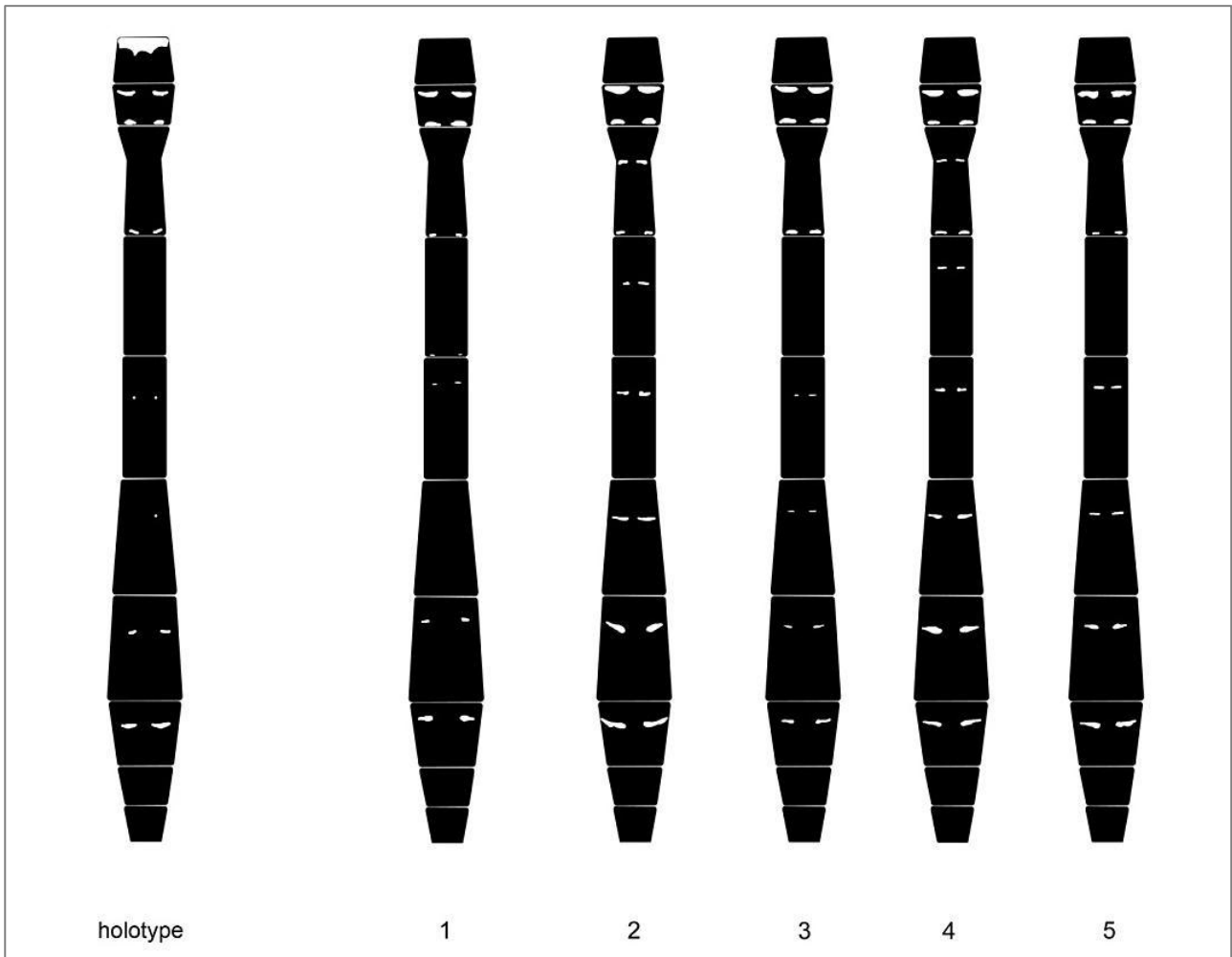






Figures 1a-e. Lateral views of five collected males *Cordulegaster vanbrinkae*, Syunik Province, Armenia, 13 July 2010. © Vasil Ananian





**Figure 2.** Dorsal views of abdomens of *Cordulegaster vanbrinkae* in holotype (left, after Lohmann 1993) and in specimens collected in Armenia (the right five figures). Note the pale pattern on the S1 in the holotype and overall variation of pale streaking in all specimens.

Verin Khotanan (39°18'39.80"N 46°22'29.14"E) he observed several individuals of an unusually dark large species of dragonflies. One of them was soon captured and instantly identified as a member of the genus *Cordulegaster*. Four more individuals (all males) displaying similar characteristics were collected at the location (Figs. 1-4).

The habitat here consisted of a shallow shaded brook in a mature hornbeam (*Carpinus* sp.) and oak (*Quercus* sp.) woodland at c. 1550m a.s.l. The rocky bed of the brook in some places was forming miniature cascades and shallow pools (Fig. 5). The dragonflies were patrolling and chasing each other over the brook.

An additional individual, likely a female (not collected), was briefly observed at the brook dipping its abdomen in water in a vertical position. One or two individuals of apparently the same species were seen patrolling the same brook at c. 200m away from the previous spot.





Figure 3. Frontal head view of *Cordulegaster vanbrinkae*, Syunik Province, Armenia, 13 July 2010. (© Vasil Ananian) Note the narrow transversal bar on front in one of the specimens (left) and bold wide bar in the remaining four.

On 14 July 2010, another individual of probably the same species was repeatedly observed in flight from as close as 2m in a similar type of woodland near the village of Vorotan, 8km away from the previous site. This was encountered over a clearing with bushes of blackberry (*Rubus* sp.) and elder (*Sambucus* sp.), at c. 1200m a.s.l.

### Identification

The collected specimens were readily attributable to the *boltonii* species complex, but their identification to the species level turned complicated from the very beginning as these differed significantly from any *Cordulegaster* known from the Caucasus and adjacent territories by their predominantly black overall coloration (Askew 2004, Dijkstra & Lewington 2006, Kalkman 2006).

Shortly after their collection, photographs of living specimens were sent to MT and later also to Gert Jan van Pelt (VP). Subsequently, all of the collected specimens were shown and three of them were given to VP (who was visiting Armenia in July 2010) for identification, examination and further deposition in the Naturalis museum (Leiden, The Netherlands). However, the specific identity of the specimens remained unresolved thereafter.



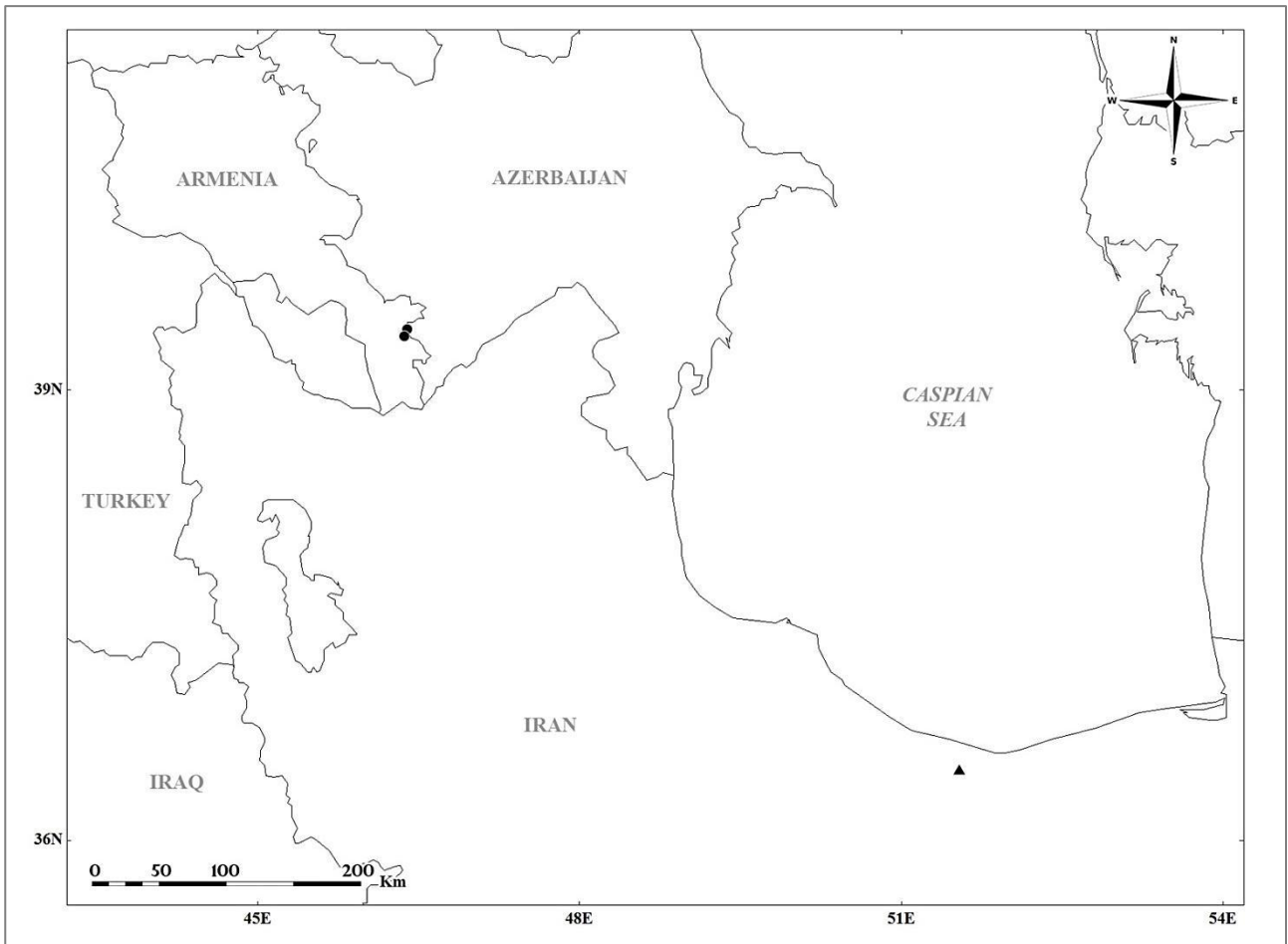
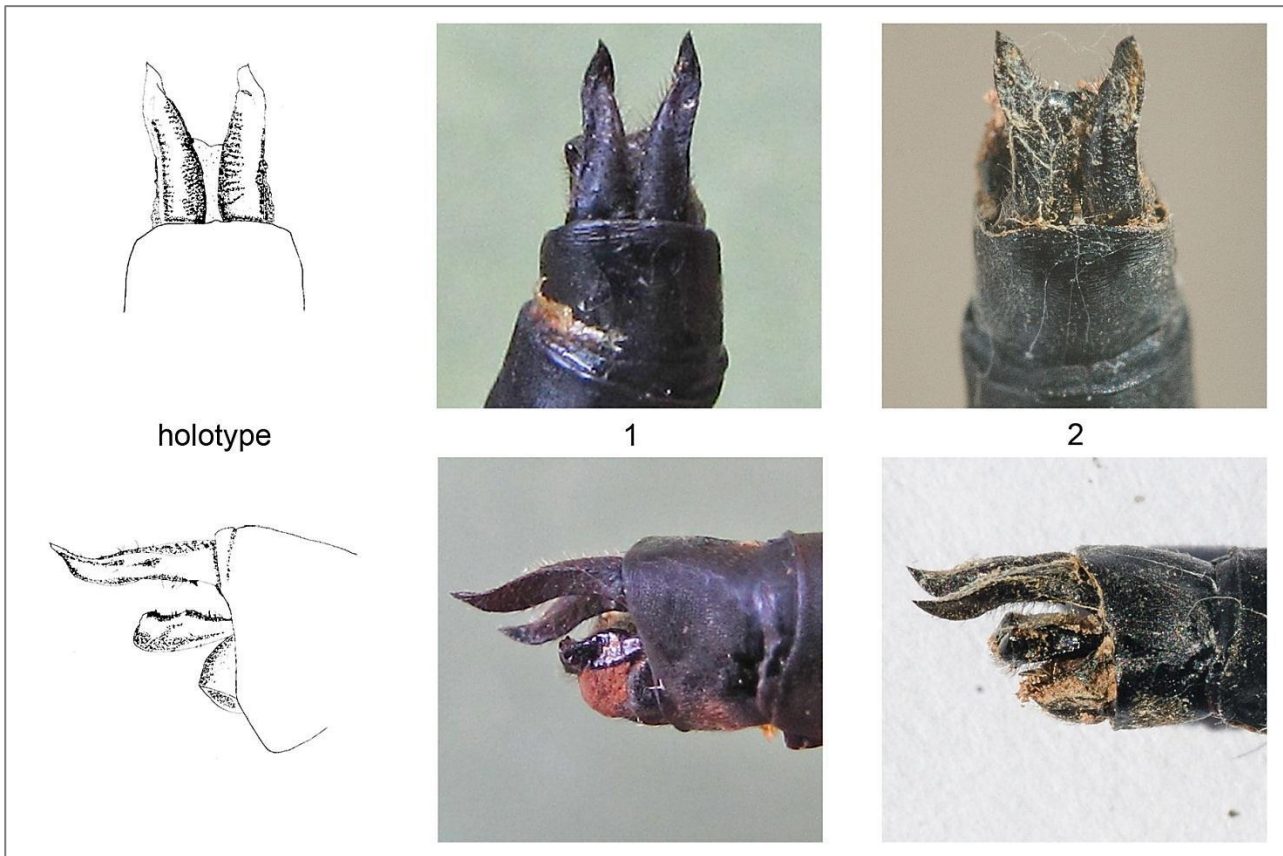


Figure 4. Map with locations of *Cordulegaster vanbrinkae* in Armenia (circles) and in Iran (triangle).



Figure 5. Habitat of *Cordulegaster vanbrinkae*, Syunik Province, Armenia, 13 August 2010. © Marc Tailly





**Figure 6. Dorsal and lateral views of S10 and anal appendages of *Cordulegaster vanbrinkae* in holotype (left, from Lohmann 1993) and in two of the five specimens collected in Armenia. © Vasil Ananian, © Marc Tailly**

In March 2011, some photographs of living specimens were sent to other experts, who suggested these specimens pertain probably to *C. vanbrinkae* (J-PB, Henri Dumont and Asmus Schröter to MT pers. comm. 2011). One of them (AS) was familiar with the holotype of that species. Afterwards, VP, having an opportunity to compare the three specimens from Armenia with the holotype of *C. vanbrinkae* loaned from MNH Basel, has expressed the same opinion regarding their identity (VP to MT pers. comm. 2011). However, very dark individuals of *C. picta* exist in Greece and North Turkey and these were not safely eliminated until J-PB has examined photographs of anal appendages of two of the specimens (Fig. 6) and concluded that the *Cordulegaster* males collected in Armenia belong to *C. vanbrinkae* (J-PB pers. comm. 2012) and are structurally quite distinct from *C. picta*.

The two remaining specimens at the authors' hands and photographs of all five living specimens were compared with the original description of *C. vanbrinkae* in Lohmann (1993). While overall external appearance of the specimens resembled the description by H. Lohmann, differences in some characters were found. These mainly related to colour interpretations (e.g. "red-brown" vs. "black" on some body parts, probably due to the post mortem colour change in the holotype) and measurements in wings. Some of the more obvious variations are presented in the Table 1. These are, how-



ever, best regarded as intraspecific variations within *C. vanbrinkae* (J-PB pers. comm. 2012).

**Table 1. Variation of some characters between the holotype of *C. vanbrinkae* and the five specimens collected in Armenia.**

Character	<i>C. vanbrinkae</i> , holotypus ♂ (source: Lohmann 1993)	<i>C. vanbrinkae</i> , five ♂♂ (this study)
anal loop	4 cells	5 cells in at least two specimens *
yellow pattern on metepisternum consists of	3-4 marks	3 marks
transversal bar on front	absent	prominent, dark brown in four specimens; narrow, but still distinct in one specimen
eye color in live specimens	n/a	emerald green
first abdominal segment dorsally	depicted with extensive pale pattern anteriorly	black

\* the character requires examination in the three specimens donated to Naturalis museum.

## Discussion

Both of the sites of discovery in Armenia were revisited by MT on 13 August 2010, but the dragonflies were not found. Possibly, the flight period of this species ends in the first third of August, as in other *Cordulegaster* spp. in the region (Akramowski 1948, Kalkman & van Pelt 2006).

Armenia is a rather small country and relatively well studied by odonatologists (Akramowski 1948, 1964; Taily et al. 2004), but *C. vanbrinkae* is probably rare and localized in the country, because for many decades it escaped the notice of entomologists and collectors.

None of the known species' habitats in Armenia are protected. Active loggings by local communities were recorded on visits to both sites. The species needs urgent conservation measures developed and submitted to the Armenian Ministry of Nature Protection. Besides, its targeted search should be conducted in other parts of south-





ern Armenia (as well as in similar lowland woodlands in Nagorno-Karabakh), with particular emphasis on surveys within Specially Protected Areas such as Shikahogh State Reserve. The study of the species' distribution, ecological requirements, assessment of its threats and its inclusion in the National Red Book are all essential.

## Acknowledgements

We would like to thank Jean-Pierre Boudot, Henri Dumont, Heiner Lohmann, Asmus Schröter and Gert Jan van Pelt for their valuable comments. J-PB has resolved the ID puzzle, has additionally helped with locating the paper by H. Lohmann, and has kindly reviewed an early draft of our paper. We also thank Martin Schorr for editorial assistance. Hannes Paulus provided the exact data of the locus typicus browsing his diary; thanks for this! VA would like to thank his colleagues from the Acopian Center for the Environment, American University of Armenia, who participated in the primary field-work funded by the UNDP/GEF grant.

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## Appendix

**Supplemental material** to the locus typicus derived from the expedition diary of Prof. Dr. Hannes Paulus, Universität Wien, Fakultät für Lebenswissenschaften, Department für Evolutionsbiologie, Althanstraße 14, A-1090 Wien, Austria (E-mail from 15. August 2012 to the editor):

*"Wir fuhren damals von Chalus nach Süden, um vor Marzanabad nach Osten Richtung Kenis - Heyrat nach Weyser (Veysar) zu gelangen. Von Veysar von einer Holzfabrik geht eine Forststraße nach Norden in die "Urwälder" (mächtige Buchen, Eichen, Linden etc.). Nach meinen Notizen sind wir ca. 17 km auf dieser Straße gefahren und dort 2/3 Tage geblieben. Der Fundpunkt der Libelle liegt also hier: 36°31'12.15"N/ 51°31'12.19" E, ca. 1150m (damals mit Höhenmesser gemessen). ... Ich hatte damals u.a. nach Bergbachtieren gesucht. Meine Notiz: "Gebirgsbach, relativ viel Wasser, ca. 14 Grad,; Untergrund: Schiefer (viele Pflanzenfossilien führend), Kalk und dazwischen sogar Granit/Gneis + Konglomerat. Der Bach beherbergte viele von 2-3 Arten Hydraenidae, *Limnius opacus*, *Elmis coiffaiti* und eine bis heute von mir nicht beschriebene *Elmis (iranica nov.)*; außerdem gab es viele Trichopteren- und Plecopterenlarven."*

