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A new species in the *Pollenia viatica* species-group from Sierra de Guadarrama, Spain (Diptera: Calliphoridae)

[Eine neue Art der *Pollenia viatica*-Artengruppe aus der Sierra Guadarrama, Spanien (Diptera: Calliphoridae)]

by
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Abstract ***Pollenia rufifemorata* spec. nov.** is described from material from Spain and a revised key to the *Pollenia viatica* species-group is provided.

Key words Diptera, Calliphoridae, *Pollenia*, new species, Spain, determination key

Zusammenfassung ***Pollenia rufifemorata* spec. nov.** wird nach Material aus Spanien beschrieben und ein revidierter Schlüssel zu der *Pollenia viatica* Artengruppe ist gegeben.

Stichwörter Diptera, Calliphoridae, *Pollenia*, neue Art, Spanien, Bestimmungsschlüssel

Introduction

During a study on the distribution of Calliphoridae along an altitudinal gradient in Central Spain using carrion baited traps BAZ et al. (2007) captured 27 male and 31 female specimens of a species which was provisionally identified as *Pollenia bicolor* ROBINEAU-DESVOIDY. One of us (K. R.) subsequently had the opportunity to examine 7 of the males and 16 of the females and after close examination concluded that the specimens correctly belonged in the *viatica* species-group of *Pollenia* ROBINEAU-DESVOIDY, 1830 (ROGNES 1991b), but that they represent a new species, which is described below as the eighth species in the *viatica*-group.

Material and methods

Material. The material was captured in squid baited pitfall traps operating during all of June, July and August in an altitudinal gradient between 1100 and 1900 m in the Sierra de Guadarrama mountains in Central Spain (between Lozoya and Puerto de Navafría). Traps were emptied every 15 days and specimens were preserved in alcohol (more details in BAZ et al. 2007). K. R. received 23 alcohol specimens in two tubes, each with a hand-written label reading "*Pollenia ponti / bicolor*". These specimens were subsequently pinned and dried. Because of shrinkage it was not possible to measure head width of all specimens. 35 specimens in alcohol remain in UAS and have been examined by A. B.

Dissections and illustrations. The methods used for dissection follow the description in ROGNES (2002). The expression "dissected by K. R.", below, means that for all such specimens the tergites T1–5 are glued to a piece of card on the pin below the specimen, but above the labels. In addition, it means, for the males, that the ST1–5 and all genital parts are kept in glycerol in a glass vial below the labels on the pin, and, for the females, that the spermathecae and the part of the uterus with the lateral ducts are kept in glycerol in a glass vial below the labels on the pin, and that the ST1(or 2)–5 and ovipositor, slit open lengthwise, are mounted in Euparal on a microscopic slide given a "G. pr." [= genital preparation] number. Illustrations were pre-

pared by means of simple digital photography. An OLYMPUS digital camera "μ [mju] 300" was hand held directly above the eye-piece (afocal mount), and the picture files were treated in Adobe Photoshop Elements. Line drawings were traced from printouts of the photographs.

Abbreviations

KR = Knut ROGNES' private collection, Stavanger, Norway
UAS = Departamento Zoología y Antropología Fisica, Universidad de Alcalá, Alcalá de Henares, Spain
UMOX = The University Museum, Oxford, United Kingdom
a. s. l. = above sea level

a = anterior
ad = antero-dorsal
av = antero-ventral
p = posterior
ph = posthumeral
pv = postero-ventral
v = ventral
ST = abdominal sternites
T = abdominal tergites.

Revised key to species of the *Pollenia viatica* species group

The new species can be distinguished from its closest relatives in both sexes by the revised key below, where couplets 0–2 replace couplets 1–2 of the key to the species of the *viatica* species-group published by ROGNES (1991b: 444–445).

0 Ground colour of tibiae and at least tips of femora yellow **1**
– Ground colour of legs wholly black; mid tibia with 2–4 *ad* setae; scutellum with at least 4–5 pairs of marginal setae; ground colour of abdomen black **3**

1 Mid tibia with 1 *ad* seta; scutellum with 3 pairs of marginal setae; ground colour of abdomen yellow or black; facial carina very broad, broadest towards lowermost part **2**
– Mid tibia with 2–3 *ad* setae; scutellum with 4 pairs of marginal setae; outer *ph* absent; epaulet yellow basally, brownish distally; basicosta yellow; no pale hairs on underside of wing at node of junction of subcosta and humeral cross-vein; ground colour of humeral callus black, of both femora and tibiae yellow, of abdomen wholly black (♂ ♀); facial carina narrower, broadest at middle; ♂: cerci about as long as surstyli; surstyli in profile slightly curved, narrowest at middle and swollen distally, apical part bent towards midline in posterior view (Figs. 1–2); aedeagus long and narrow, hypophallic lobes wing-like, outer edges strongly sclerotised, denticulate at hind end, straight and converging toward tip of acrophallus in posterior view; tips of paraphallic processes curving towards midline, making a right angle to the longitudinal axis of aedeagus (Figs. 3–4); ♀: epiproct and cerci with slender spines, epiproct with 18–24 spines ... . ***Pollenia rufifemorata* spec. nov.**

2 Outer *ph* seta absent; epaulet yellow or brown, basicosta pale yellow; almost always a few pale hairs on underside of wing at node of junction of subcosta and humeral cross-vein (requires very careful observation); ground colour of humeral callus black (♂) or yellow (♀); ground colour of femora usually, of tibiae always yellow; ground colour of abdomen usually extensively yellow, in most cases with a black middorsal stripe of variable width and a black band along hind margin of tergites, in very dark specimens yellow colour discernible on ventral parts of tergites only; ♂: cerci shorter than surstyli, rather broad as seen from behind; surstyli in profile with right angled antero-ventral corner; hypophallic lobes of characteristic shape, wing-like, in dorsal view with gently curved, denticulate and convex outer edge; ♀: humeral callus yellow in ground colour; epiproct and cerci with short, very stout spines in low number; epiproct with about 8–9 spines ..... ***Pollenia bicolor* ROBINEAU-DESVOIDY**

– Outer *ph* seta present; epaulet black, basicosta brown or dark brown (♂) or yellow (♀); no pale hairs on underside of wing at node of junction of subcosta and humeral cross-vein; ground colour of femora mostly black, but at least yellow apically; ground colour of tibiae yellow; ground colour of abdomen wholly black (♂ ♀); ♂: cerci slightly longer than surstyli, rather narrow as seen from behind; surstyli in profile with evenly rounded antero-ventral corner; aedeagus with a strongly developed elon-gate pocket midventrally basad of proximal end of hypophallic lobes; hypophallic lobes square, in dorsal view with concave outer edges; ♀: humeral callus black in ground colour; epiproct with 15–20 spines all of which more slender than those of *bicolor* ..... ***Pollenia ruficrura*** **Rondani**

3 Five remaining species of *viatica* species-group (follow couplet 3 of key in Rognes 1991b: 445)

Pollenia rufifemorata spec. nov.

(Figs 1–9)

Pollenia cf. bicolor: Baz et al. 2007: 292 (Tables 1 & 2), 293 (Fig. 3), 294 (passim, also Fig. 4).
Pollenia bicolor: Baz et al. 2007: 7; misidentification.

Material examined: Type material (examined by K. R.). **Holotype** ♂, SPAIN: Province of Madrid, between Lozoya and Puerto de Navafría in the Sierra de Gauadarrama mountains, 1400 m a.s.l., 30.vii.–14.viii.2003 (dissected by K. R.) (Arturo Baz, pitfall trap baited with pieces of squid carcass) (K R, eventually UMOX). **Paratypes**: SPAIN: same locality and date as for holotype, 1400 m a.s.l., 1♂ 5♀♀ (1♀ dissected by K. R., G. pr. 404); same locality and date as for holotype, 1300 m a.s.l., 5♂♂ 11♀♀ (1♂ dissected by K. R.; 2♀♀ dissected by K. R., G. pr. 403, 405) (all Arturo Baz, pitfall traps baited with pieces of squid carcass) (KR, eventually UMOX).
Additional material (examined by A. B.). SPAIN: same locality as holotype, 1600 m a.s.l., 30 July–14 August 2003, 1♀, 14–28 August 2004, 1♀; same locality as holotype, 1500 m a.s.l., 30 July–14 August 2003, 3♂♂ 2♀♀; same locality as holotype, 1300 m a.s.l., 14–28 August 2003, 5♂♂ 1♀; same locality as holotype, 1200 m a.s.l., 15–30 July 2003, 11♂♂ 10♀♀ (all Arturo Baz, pitfall traps baited with pieces of squid carcass) (UAS).

Etymology

The specific epithet "*rufifemorata*" (latin, compound, adjectival) is derived from "*rufus*" (latin, adjective, masculine, singular) meaning red and "*femur*" (latin, noun, neuter, singular) meaning the thigh, reflecting the reddish yellow colour of the femora.

Description

♂ ♀. **Head**: Ground colour black except for facial membrane, facial ridges, facial carina, lunula, lower facial margin, anterior third of parafacial, area in front of genal dilation and area below parafacial which have a reddish yellow ground colour. Head with even greyish yellow microtomentum, except occasionally for bare patches along highest part of facial carina where the ground colour shines through. Very little microtomentum on pedicel, which appears bright yellow. Antenna yellow, first flagellomere darkened distally and along front edge. Facial carina broad, rounded along top, seen from in front narrower than first flagellomere and never attaining the width of the carina in *bicolor* or *ruficrura*, which is broader than first flagellomere, but more like the one e.g. in *P. dasypoda* Portschinsky. Facial carina broadest at middle, whereas the one in *bicolor* and *ruficrura* widens out towards its ventral end. Interfrontal stripe dark reddish brown. Parafacial vestiture black, setae slightly shorter than width of first flagellomere. No pale setulae present. Genal dilation with pale vestiture in hind third, anterior part with short black setae. Lunula with microtomentum. Occiput with two irregular rows of short black setulae behind postocular row of setae. Palp yellow, slightly curved, with black setae distally.
Thorax: Outer posthumeral seta absent. Scutellum with 1 discal and 4 marginal pairs of setae; the lateral seta, situated below and slightly behind the basal seta and close to the ventral edge of the scutellum, is well developed and only slightly shorter than the basal seta, in contrast to in *bicolor* and *ruficrura*, where it is absent or very strongly reduced. Coxopleural streak triangular, reaching halfway to katepisternum. Spiracles yellow. **Legs**: Thin layer of pale microtomentum. Ground colour of coxae brown, of trochanters reddish yellow, of femora reddish yellow, of tibiae reddish yellow, of tarsi black.

Front femur sometimes darkened in basal half. Front tibia with 1 *pv* seta. Mid tibia with 2–3 *ad*, 1 *v*, 2 *p*, 0–1 *pd* setae. Hind tibia with 3–4 *ad*, 2 *av* (weak), 2–3 *pd* setae. Setae and ground setulae all black also on *pv* surface of mid and hind femora. Coxae and trochanters with varying amounts of pale setulae.
Wings: Subcostal sclerite concolorous with basicosta, without any long pale setulae, and covered by pale microtomentum only. Basicosta yellow, epaulet yellowish brown, darker towards periphery. Node at junction of humeral crossvein and subcosta bare on underside of wing. Wing veins yellowish brown. Lower and upper calypter pale white (females), lower calypter infuscated in male. Cell r_{4+5} open, almost closed in one specimen.
Abdomen: Rather narrow in dorsal view. Ground colour black, with greyish white microtomentum in shifting pattern. Setae black, except ventrally on T1–2 and on ST1 and ST2 where some are yellowish.

♂. Frons at narrowest 0.039–0.046 × head width (mean 0.043, n = 7). Frons slightly wider than front ocellus. Fronto-orbital plates touching, separated by a thin black line. Frontal setae 6–8, not reaching narrowest part of frons. Fronto-orbital plates with small irregular setulae in between and in a single row outside of main frontal setae, these setulae reach almost to narrowest part of frons. Cerci and surstyli as in Figs 1–2. Surstylus slightly curved in profile view, narrowed in middle and slightly swollen at distal end. Aedeagus as in Figs 3–4. Ventral plate with concave upper (posterior) border in profile view (arrow in Fig. 3). Paraphallic tips curved inward distally, apex pointing towards midline at a right angle. Postgonite with a very small basal seta. Ejaculatory sclerite simple and straight. Length 6,5 – 8 mm.

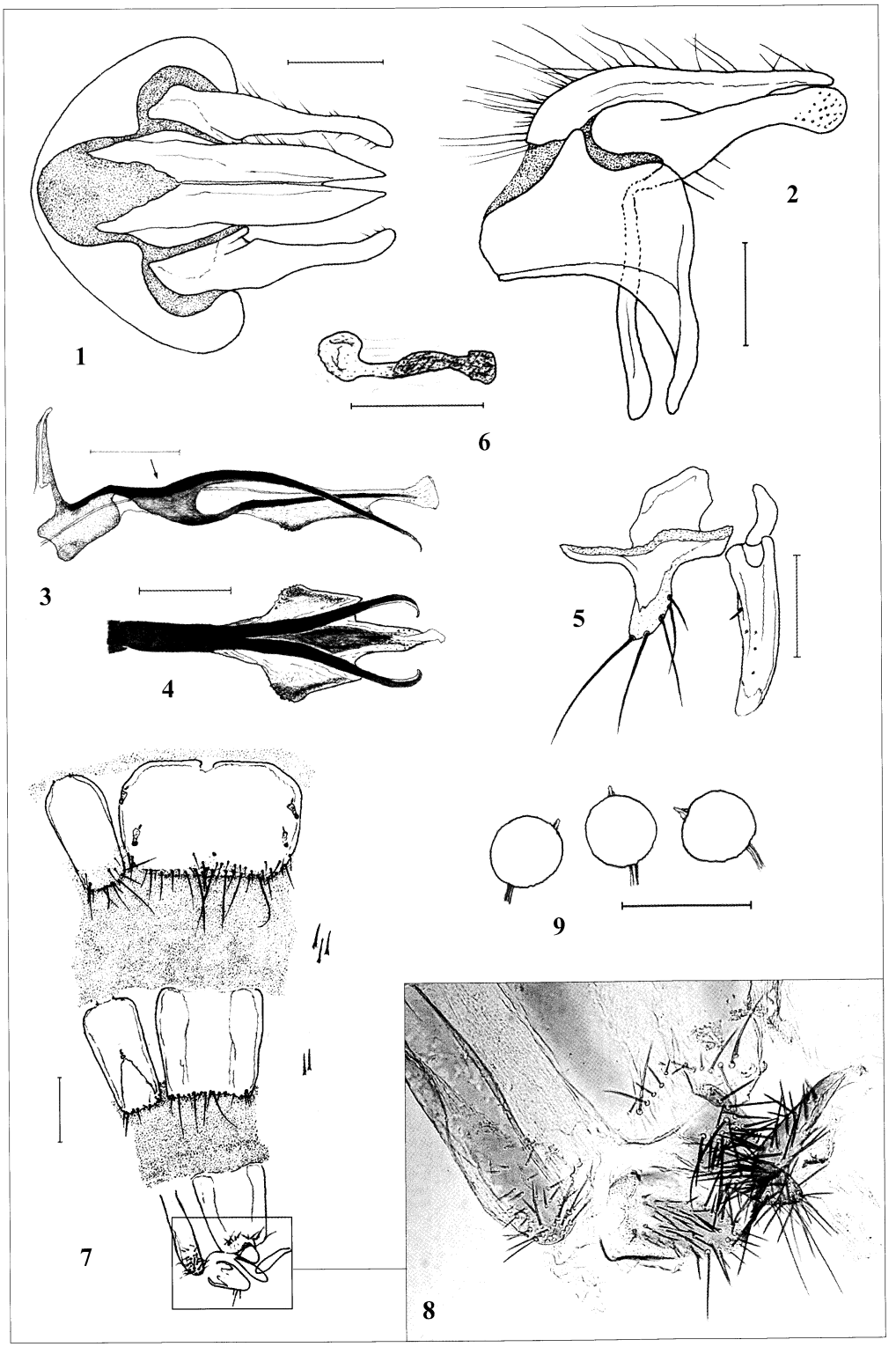
♀. Frons at vertex 0.326–0.350 × head width (mean 0.337, n = 9). Fronto-orbital plate about as wide as or slightly narrower than half the interfrontal stripe. Interfrontal stripe with whitish microtomentum almost covering its dark brown ground colour. Fronto-orbital plates with 8 – 9 frontal setae, and 1–2 irregular rows of small setulae outside the main setae. Ovipositor sclerites elongate (Fig. 7). Pleural membrane 6 microtrichiose in posterior two fifths. Pleural membrane 7 microtrichiose in posterior sixth. T7 halves narrower than weakly sclerotised area between them. ST7 with an almost unsclerotised very sharply outlined triangular area pointing forwards from whole hind edge with its apex at about middle of ST7. T8 with 6+7 marginal spines, well removed from the hind edge (Fig. 8) (only slide G. pr. 405 showed the number of marginal spines clearly). ST8 with pale spines in posterior third. Epiproct and cerci without microtrichae, but with numerous straight slender spines. Epiproct with 18–24 spines. Hypoproct microtrichiose and with numerous straight spines. Lateral sacs a pair of unsclerotised simple tubes. Three almost circular spermathecae with apical papilla. [Three ovipositor slides examined, G. pr. 403, 404, 405.] Length 5 – 8 mm.

Dicussion of systematic position

On account of the spinous ovipositor tip, pale basicosta, yellow palp, single *pv* seta on front tibia, reduced number and size of the *av* setae on the hind tibia, elongate ovipositor sclerites, and shape of aedeagus the new species falls nicely into the *Pollenia viatica* species-group as defined by ROGNES (1991b), although its facial carina is rather narrow for a *viatica* group member. Further, the presence of yellow legs, considered an apomorphic feature in the context of the *viatica* species-group, places it in the *bicolor* sub-group together with *P. bicolor* ROBINEAU-DESVOIDY, 1830 and *P. ruficrura* RONDANI, 1862. With the inclusion of *rufifemorata* spec. nov. the expanded *bicolor* sub-group no longer is defined by a single *ad* seta on the middle tibia, and 3 pairs of marginal scutellar setae, but only by the leg colour.

Captions to the figures of opposite page →

Figs 1–9: *Pollenia rufifemorata* spec. nov. (Figs 1–6: Holotype ♂; figs 7–9 Paratype ♀). – **1**: Cerci, surstyli and epandrium, posterior view. – **2**: Cerci, surstylus, epandrium and processus longus, lateral view; – **3**: Aedeagus, lateral view; – **4**: Distiphallus, posterior (dorsal) view; – **5**: Pre- and postgonites; – **6**: Ejaculatory sclerite; – **7**: Ovipositor (G. pr. 405). Stipple indicates extent of microtrichiae; insets: microtrichiae enlarged. Scale-bar = 0,5 mm; – **8**. Ovipositor tip (G. pr. 405); – **9**: Spermathecae (same specimen as in Figs 7, 8). Scale-bars in figs 1–6 & 8 = 0.2 mm, in fig. 7: 0.5 mm.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The male genitalia ressemble those of *P. ponti* Rognes, 1991 but the aedeagus differs and is unusual in having the paraphallic tips curving inwards in the fashion of *P. labialis* Robineau-Desvoidy, 1863 (cf. Rognes 1991a). Interestingly, the general shape of the aedeagus is similar to the one present in all the black-legged members of the *viatica* species-goup, most likely a plesiomorphic feature at the level of the *bicolor* sub-group.

In the female genitalia the pattern of sclerotisation of ST7 is unique within the *bicolor* sub-group. In the both *P. bicolor* and *P. ruficrura* the ST7 is evenly sclerotised with no weakly sclerotised area at the hind end. Again, however, the presence of weak sclerotisation at the hind end of ST7 is most likely a plesiomorphic feature at this level. All the remaining five *viatica*-group members have this feature, although the area is not as sharply demarcated in any of them as it is in *rufifemorata* spec. nov., and usually it has a different form (*ponti* Rognes, *bulgarica* Jacentkovsky, 1939, *mediterranea* Grunin, 1966, *fulvipalpis* Macquart, 1835) (Rognes 1991b). E.g. in *P. ponti* the weakly sclerotised area at the hind end of ST7 measures only about 1/5–1/6 of the length of the sclerite (cf. Rognes 1991b: fig. 32).

The relationship of the species can be summarised thus: (((*bicolor* + *ruficrura*) + *rufifemorata* spec. nov.) + five remaining species in *viatica* species-group).

Biology

Specimens were captured at altitudes from 1200–1600 m above sea level, from July 15 to August 28. The dates of capture fit into the *viatica*-group pattern (Rognes 1991b), and indicate that the new species also has only one generation per year. Unfortunately, almost nothing is known for certain about the life-cycle of the *viatica*-group members. It is likely that an earthworm acts as host (or prey) for the larval stages, but perhaps there are other candidates. The following earthworm species have been recorded from Lozoya (at the lower end of the altitudinal gradient): *Allolobophora caliginosa* (Savigny, 1826), *A. rosea* (Savigny, 1826) and *Octodrilus complanatus* Dugès, 1828, and the following species have been recorded from nearby localities: *Allolobophora chlorotica* (Savigny, 1826), *Dendrobaena alvaradoi* Moreno, Jesús & Diaz, 1982, *D. rubida* (Savigny, 1826), *Eisenia eiseni* (Levinsen, 1884), *E. tetraedra* (Savigny, 1826), *Lumbricus friendi* Cognetti, 1904, *Octolasion cyaneum* (Savigny, 1826) and *O. lacteum* (Örley, 1881) (Jesús, Fernández & Gutiérrez 2001, 2002). The high number of specimens captured in the traps is unusual for a new species, and suggests a special biology.

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Literature

Baz, A.; Cifrián, B.; Diaz-Aranda, L. M. & Martin-Vega, D. (2007): The distribution of adult blow-flies (Diptera: Calliphoridae) along an altitudinal gradient in Central Spain. – Annales de la Société entomologique de France (Nouvelle série) **43**: 289–296.

Jesús, J. B.; Fernández, B. &. Gutiérrez, M. (2001): Lombrices de tierra de la Comunidad de Madrid (España). I. Generos *Allolobophora* y *Dendrobaena* (Annelida, Oligochaeta). – Boletín de la Real Sociedad Española de Historia Natural (Sección Biología) 96: 125–135.

Jesús, J. B.; Fernández, B. &. Gutiérrez, M. (2002): Lombrices de tierra de la Comunidad de Madrid (España). II. Generos *Eisenia, Eiseniella, Eiseniona, Lumbricus, Octodrilus, Octolasion, Hormogaster, Microscolex, Eukerria* y *Ocnerodrilus* (Annelida, Oligochaeta). – Boletín de la Real Sociedad Española de Historia Natural (Sección Biología) **97**: 61–69.

ROGNES, K. (1991a): Blowflies (Diptera, Calliphoridae) of Fennoscandia and Denmark. – Fauna entomologica scandinavica **24**: 1–272; Leiden, New York, København, Köln.

ROGNES, K. (1991b): Revision of the cluster-flies of the *Pollenia viatica* species-group (Diptera: Calliphoridae). – Systematic Entomology **16**: 439–498.

ROGNES, K. (2002): Blowflies (Diptera, Calliphoridae) of Israel and adjacent areas, including a new species from Tunisia. – Insect Systematics & Evolution, Supplement **59**: 1–148.

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