

# The first lichenicolous species of *Schismatomma* (Roccellaceae), *S. physconiicola* sp. nov., from Mexico

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**ABSTRACT.** The new species, *Schismatomma physconiicola*, lichenicolous on the thallus of *Physconia* cf. *muscigena*, is described from Mexico. It is the first known non-lichenized, lichenicolous species in the genus *Schismatomma*.

**KEYWORDS.** Ascomycota, lichenicolous fungus, *Schismatomma*, *Physconia*, Roccellaceae, Mexico, Sonoran Desert, taxonomy.



During our studies on lichenized and lichenicolous species of Roccellaceae, we were puzzled by a strange species abundantly parasitizing a *Physconia* collection from Baja California (Mexico). The roundish, pruinose ascomata and the 3-septate ascospores led us to compare the specimen with *Opegrapha rotunda* Hafellner, a taxon confined to *Physconia* species. A comparison with the holotype of that fungus convinced us that our specimen is distinct, is a new species and belongs to another genus. Following the key to the genera of Roccellaceae with lichenicolous species (Ertz et al. 2005), we arrived at the genus *Enterographa* which, however, appeared not to be suitable for our specimen. A careful study of other genera of Roccellaceae with only lichenized species persuaded us that the species is best described in *Schismatomma*.

## MATERIAL AND METHODS

Microscopic examination was done using hand-made sections in water, 5% KOH (K), Congo Red

with KOH pre-treatment, or Lugol's reagent (1% I<sub>2</sub>) without (I) or with KOH pre-treatment (K/I). Measurements and drawings of asci and ascospores all refer to material examined in KOH. Drawings were prepared using a drawing tube. Macroscopic photos were done using a Leica MZ 7.5 binocular microscope, with a digital camera Nikon Coolpix 4500. Microscopic photos were prepared with a Zeiss Photomikroskop III, and a digital camera Canon Powershot G5.

The following specimens of similar species were examined: *Opegrapha rotunda*: holotype (GZU); *Schismatomma dirinellum*: Spain, Castellón, Diederich 9861 (HB. DIEDERICH); *S. rappii*: U.S.A., Louisiana, Baton Rouge, Tucker 27239b (HB. DIEDERICH).

## THE NEW SPECIES

***Schismatomma physconiicola*** Ertz & Diederich,  
*sp. nov.* **Figs. 1–3**

*Schismatomma non-lichenisatum lichenicola insignis ascomatibus rotundis immersis galligenis, disco*

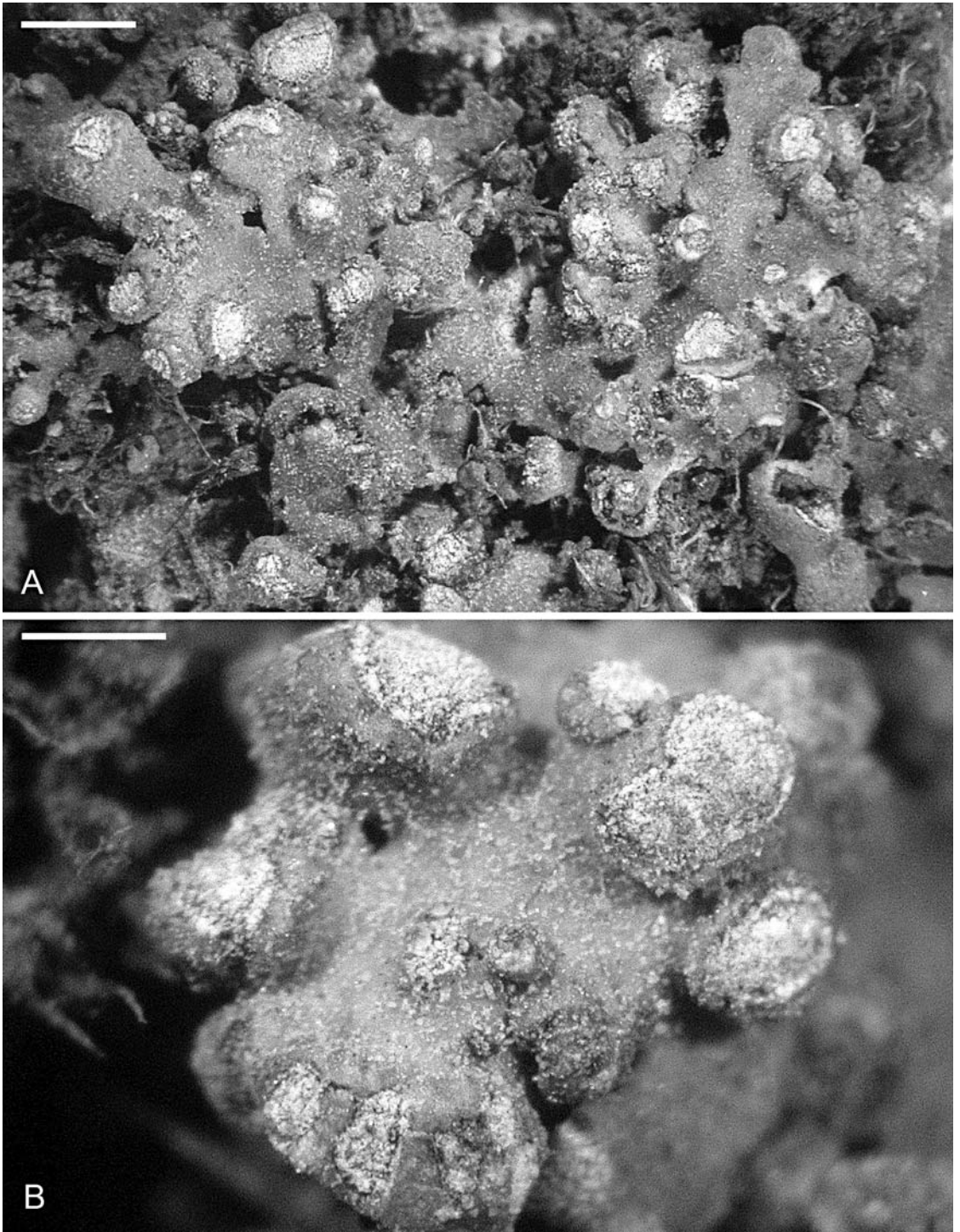
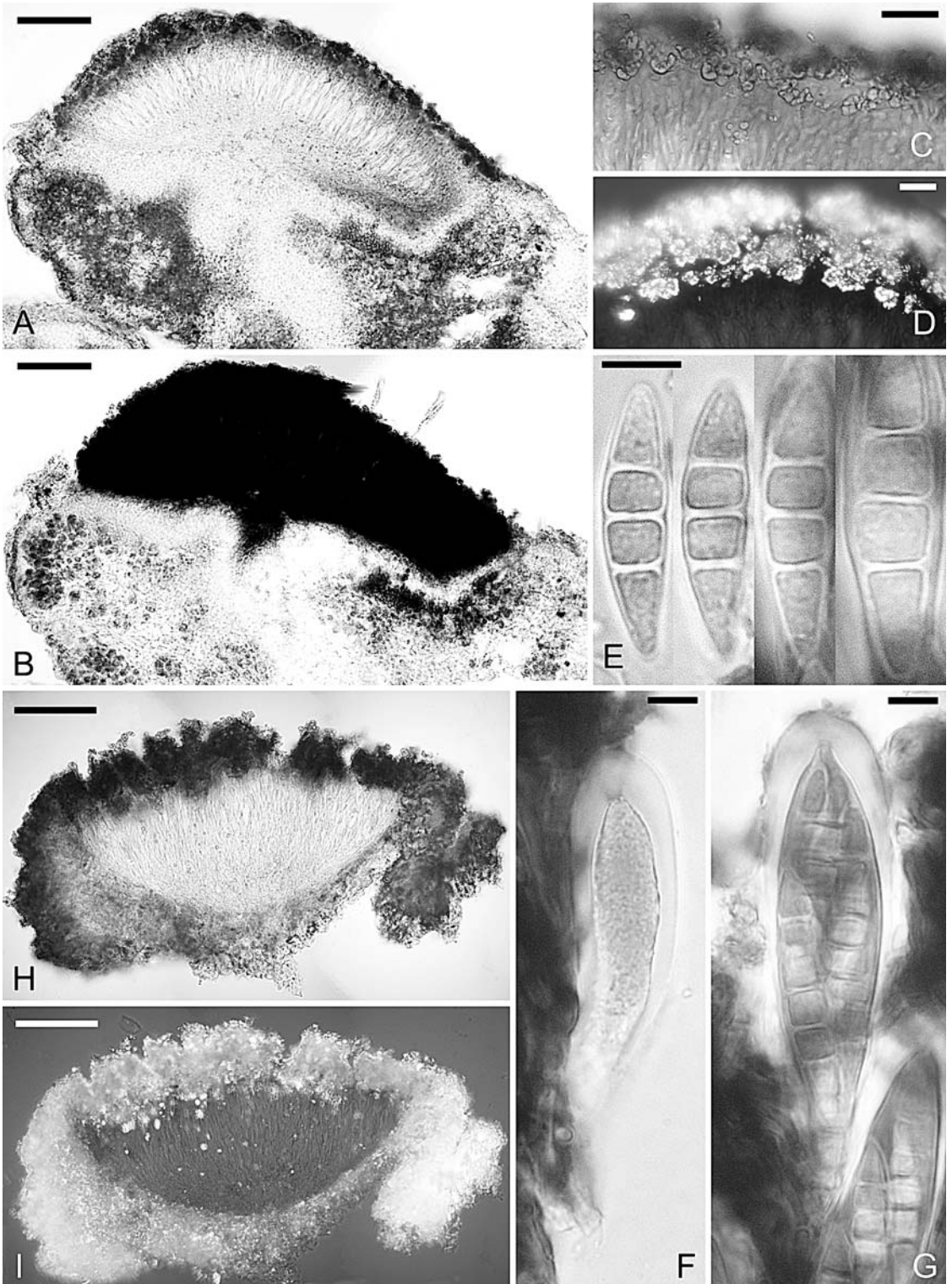
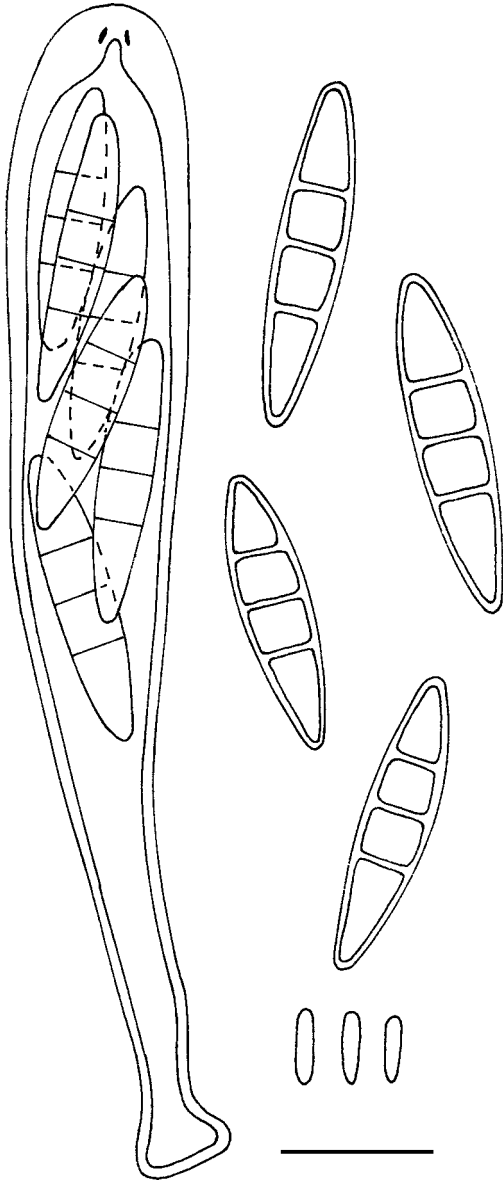


Figure 1. *Schisatomma physconiicola* (holotype) parasitizing the thallus of *Physconia* cf. *muscigena*. Scales: A = 1 mm; B = 0.5 mm.



**Figure 2.** A–G. *Schismatomma physconiicola* (holotype). A. Section through ascoma in water. B. Section through ascoma in K/I showing the amyloid reactions of hymenium, excipulum and hypothecium. C. Epihymenial crystals in water. D. Epihymenial crystals in water, observed in polarized light. E. Ascospores in K/I. F. Immature ascus in K/I, showing the blue apical ring. G. Mature ascus in K/I. H, I. *Schismatomma dirinellum* (Diederich 9861). H. Section through ascoma in water. I. Section through ascoma in water, observed in polarized light. Scales: A, B, H, I = 100  $\mu$ m; C, D = 20  $\mu$ m; E–G = 5  $\mu$ m.



**Figure 3.** *Schismatomma physconiicola* (holotype). Ascus, ascospores and conidia. Scale = 10  $\mu$ m.

*atro albo-pruinoso 0.2–1 mm diam., excipulo hyalino ad pallide brunneo e textura intricata in iodo caerulescenti, hypothecio crasso hyalino ad pallide brunneo in iodo caerulescenti, hymenio hyalino 85–105  $\mu$ m in iodo rubescenti, epihymenio pallide brunneo in iodo caerulescenti in potassio non reagenti, crystallis reniformibus ad disciformibus obtectis, ascis anguste clavatis (4–)6(–8)-sporis 65–85  $\times$  12–14  $\mu$ m, ascosporis fusiformibus 3-septatis hyalinis 18–24  $\times$  5–5.5  $\mu$ m, pycnidiiis immersis, conidiis bacilliformibus 5–6  $\times$  1  $\mu$ m.*

TYPE: MEXICO. BAJA CALIFORNIA: Guadalupe Island, narrow E–W canyon into the southern peak on the east side with rocky outcrops, 29°00'50"N, 118°15'50"W, 800 m, on soil, 4 Jan 1996, Nash 38553 (ASU, holotype; BR, HB. DIEDERICH, isotypes).

**Description.** Ascomata lichenicolous on the upper surface of the host thallus, frequently at the margins, immersed in distinct, basally constricted galls containing the photobiont of the host, dispersed, single or in groups of 2–5, rounded, with a flat, black hymenial disc usually covered by a dense, white pruina, 0.2–1 mm in diam. Excipulum hyaline, frequently pale brown in the upper part, thin, 12–20  $\mu$ m thick, of *textura intricata*, hardly distinguishable from the hypothecium below, I+ persistently blue, K/I+ blue, K-, Hypothecium hyaline to very pale brown, 30–230  $\mu$ m thick, particularly thick under the center of the ascomata, I+ persistently blue, K/I+ blue, K-. Hymenium hyaline, not interspersed with oil droplets, 85–105  $\mu$ m; hymenial gel I+ dark red, K/I+ blue; epihymenium pale brown, I+ persistently blue, K-, covered by a dense layer of crystals; crystals reniform to discoid, not dissolving in K. Paraphysoids branched, 2–2.5  $\mu$ m, apically slightly enlarged, 3–3.5  $\mu$ m, not distinctly pigmented. Asci narrowly clavate, often with a long and narrow base, (4–)6(–8)-spored, 65–85  $\times$  12–14  $\mu$ m, wall apically thickened, K/I-, except for a K/I+ blue apical ring. Ascospores fusiform, 3-septate, ontogeny starting with a median septum, straight, not or slightly constricted at septa, the two middle cells squared, the end cells elongate-triangular, 18–24  $\times$  5–5.5  $\mu$ m; perispore indistinct or absent; brownish pigmentation not observed. Pycnidia immersed in hymenium; wall hyaline below, pale brown near the ostiole. Conidia bacilliform, hyaline, aseptate, 5–6  $\times$  1  $\mu$ m.

**Distribution and host.** Known only from the type collection from Guadalupe Island (Baja California, Mexico), on the upper surface of the thallus of a terricolous *Physconia* species, provisionally referred to *Physconia muscigena* by Esslinger (2002: 382); gall-inducing, but otherwise not visibly damaging the host.

**Notes.** The lichenicolous species *Opegrapha rotunda* is similar to *Schismatomma physconiicola* in the rounded, blackish, pruinose ascomata, the 3-septate ascospores and the selection of *Physconia* as the host genus (Hafellner 1994), but differs in having

sessile ascomata with a strongly constricted base and a black excipulum. Similarly, *Opegrapha rinodinae* Vězda, described from *Phaeorrhiza nimbose* (Vězda 1969), differs by a carbonized excipulum, eventually superficial ascomata and ascospores with rounded apices. The new species clearly does not belong to *Opegrapha* because that genus always has a carbonized excipulum and, with the exception of some atypical species like *O. rinodinae* and *O. rotunda*, lirelliform ascomata.

The non-carbonized excipulum of the new species is reminiscent of the genus *Enterographa*. Following the generic treatment of the genus by Sparrius (2004), no species has pruinose ascomata, and ascomata are usually aggregated, often lirelliform or minutely punctiform.

The genus *Arthonia* has different types of asci that are usually very short, often subglobose, more rarely clavate, and the wall is strongly thickened above (Grube & Matzer 1997). The very long and narrowly clavate asci of the new species rule out inclusion in that genus.

The mainly foliicolous genus *Mazosia* is notably characterized by the combination of rounded ascomata, and an excipulum that is absent at the base of the ascomata but laterally well developed and composed of dark brown to blackish hyphae with tangentially elongate, rarely isodiametric cells (Matzer 1996). As no species is known with pruinose ascomata, this genus is not suitable for the new species either. The other distinctive characters of the genus *Mazosia* refer to thallus morphology and are unfortunately missing in lichenicolous fungi.

We were also thinking of *Cresponea* and *Lecanactis*, two genera with pruinose, apothecioid ascomata. However, species of both genera always have a carbonized excipulum, and usually well-developed and sessile apothecia (Egea & Torrente 1993, 1994).

*Schismatomma* and its recent segregate, *Sigridea*, comprise some species with rounded, pruinose ascomata. *Sigridea* species all have a carbonized hypothecium (Ertz et al. 2005; Tehler 1993), whereas it is pale in the new species. *Schismatomma* sensu Tehler (1993) is rather heterogeneous, as it includes species with rounded ascomata and others with elongate to lirelliform or stellate ascomata, some with a dark brown, others with a pale proper excipulum or

hypothecium, some with and others without ascomatal pruina.

Within the genus *Schismatomma*, *S. dirinellum* (Nyl.) Zahlbr. shares most characters with the new species: rounded, pruinose ascomata; an inconspicuous, pale proper excipulum; a usually pale brown hypothecium; similar, 3-septate ascospores; and an amyloid excipulum and hypothecium.

Material of another potentially similar species, *Schismatomma rappii* (Zahlbr.) R. C. Harris, strongly resembles *S. dirinellum*. Both have sessile, rounded ascomata with a pruinose disc, a pale proper excipulum and hypothecium, and the same amyloid reactions of the hypothecium (I+ and K/I+ blue in the upper part and violet in the lower part). *Schismatomma rappii*, however, was excluded from *Schismatomma* and provisionally referred to *Enterographa* by Tehler (1993), although the combination in the latter genus was not made. The author did not discuss or justify this decision. The species was not treated in the recent revision of *Enterographa* by Sparrius (2004).

Both *Schismatomma dirinellum* and *S. rappii* differ from the new species by sessile ascomata, a hypothecium that is I+ and K/I+ violet in the lower part (but blue in the upper part), differently shaped pruina crystals, more easily separating paraphyses (in KOH, following light pressure on the cover slip), and by being lichenized, instead of lichenicolous.

We conclude that *Schismatomma* is the best available genus within the Roccellaceae to describe the new species on *Physconia*.

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#### LITERATURE CITED

- Egea, J. M. & P. Torrente. 1993. *Cresponea*, a new genus of lichenized fungi in the order Arthoniales (Ascomycotina). *Mycotaxon* 48: 301–331.
- & ———. 1994. El género de hongos liquenizados *Lecanactis* (Ascomycotina). *Bibliotheca Lichenologica* 54: 1–205.
- Ertz, D., C. Christnach, M. Wedin & P. Diederich. 2005. A world monograph of the genus *Plectocarpon* (Roccellaceae, Arthoniales). *Bibliotheca Lichenologica* 91: 1–155.

- Esslinger, T. L. 2002. *Physconia*. Pages 373–383. In T. H. Nash III et al. (eds.), *Lichen Flora of the Greater Sonoran Desert Region. I. Lichens Unlimited*, Arizona State University, Tempe, Arizona.
- Grube, M. & M. Matzer. 1997. Taxonomic concepts of lichenicolous *Arthonia* species. *Bibliotheca Lichenologica* 68: 1–17.
- Hafellner, J. 1994. Beiträge zu einem Prodromus der lichenicolen Pilze Österreichs und angrenzender Gebiete. I. Einige neue oder seltene Arten. *Herzogia* 10: 1–28.
- Matzer, M. 1996. Lichenicolous ascomycetes with fissitunicate asci on foliicolous lichens. *Mycological Papers* 171: i–x, 1–202.
- Sparrius, L. B. 2004. A monograph of *Enterographa* and *Sclerophyton*. *Bibliotheca Lichenologica* 89: 1–141.
- Tehler, A. 1993. The genus *Schismatomma* (Arthoniales, Euascomycetidae). *Opera Botanica* 118: 1–38.
- Vězda, A. 1969. Beiträge zur Kenntnis der flechtenbewohnenden Pilze in der Tschechoslowakei. II. Zwei neue Arten: *Opegrapha rinodinae* sp. nov. und *Polycoccum galligenus* sp. nov. *Česká Mykologie* 23: 104–109.

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