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First record of the genus *Archidispus* (Acari: Scutacaridae) from Iran with description of a new species

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Abstract

The mite species *Archidispus esfarayenicus* Hajiqanbar & Khaustov **sp. nov.** (Acari: Heterostigmatina: Scutacaridae) detached from under elytra of a carabid beetle, *Elaphropus (Tachyura) diabrachys* (Kolenati, 1845) (Coleoptera: Carabidae), is described and illustrated from Iran. The new species is distinguishable from congeners by the characteristically modified setae 1a, dilated thoroughly with an apical thorn. This is the first record of the genus *Archidispus* from Iran.

Key word: mite, beetle, *Archidispus*, Scutacaridae, Carabidae, Heterostigmatina.

Introduction

Heterostigmatic mites of the family Scutacaridae (Acari: Trombidiformes: Heterostigmatina) inhabit soil, forest litter, decomposing organic substrates, moss and manure. They are also associated with various arthropods including ants, bees, flies, beetles and arachnids (Khaustov 2008). This family consists of 24 genera and more than 800 species (Zhang *et al.* 2011) and are considered as fungivorous mites (Khaustov 2008; Jagerbacher-Baumann & Ebermann 2012). One of the specious scutacarid genera is the genus *Archidispus* Karafiat, 1959 with about 70 described species that are mostly associated with beetles of the family Carabidae (Khaustov 2008; Kurosa 2009). Distinct female dimorphism has been known from various scutacarids including species of the genus *Archidispus*. They are nonphoretic form and phoretic form (phoretomorph), the latter adapted as a wandering form and showing characters suitable for phoretic behavior (Ebermann 1990, 1991a, b).

Until now, four scutacarid genera *Heterodispus*, *Scutacarus*, *Imparipes* and *Pygmodispus* have been reported from Iran (Mahunka & Rohde 1970; Kamali *et al.* 2001; Ebermann *et al.* 2003), but the genus *Archidispus* have never been previously found in the country. The aim of this paper is to describe a new species of the genus *Archidispus* phoretic on a carabid beetle in northeastern Iran.

Material and methods

Mites were collected from lower surface of elytra of a carabid beetle, cleared in lactophenol and fixed in Hoyer's medium. The host beetle was collected by attracting to a light trap. The morphology of mites was studied using a light microscope with phase contrast illumination. All measurements in this description are given in micrometers (μm) for the holotype and five paratypes (in parentheses). Morphological nomenclature mostly follows Lindquist (1986); the nomenclature of subcapitular setae and the designation of cheliceral setae follow Grandjean (1944, 1947), respectively. Coordinates of geographical position have been recorded using GPS. The carabid beetle host was identified by B. M. Kataev (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia).

The holotype is deposited in the Acarological Collection, Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran. One paratype is deposited in the Collection of Nikita Botanical Gardens, Yalta, Ukraine. The rest of paratypes are retained with the holotype.

Systematics

Family Scutacaridae Oudemans, 1916

Genus *Archidispus* Karafiat, 1959

Archidispus esfarayenicus sp. nov. (Figs. 1–6)

Diagnosis

All dorsal setae setiform and distinctly barbed; setae c_2 with a sclerotized alveolar canal; setae e distinctly longer than and anterolaterally to setae f ; setae h_2 anterolaterally to setae h_1 , both subequal. Setae $1a$ characteristically modified, dilated with an apical thorn; other setae of sternal plates setiform, smooth and pointed; setae ps_1 and ps_3 barbed, ps_3 longer than ps_1 . In tibiotarsus I, solenidion ω_1 finger shaped, solenidia ω_2 and ϕ_2 homomorph, uniformly thin; solenidion ϕ_1 prominent, well-developed and finger shaped. Tarsus IV with pretarsus and two small simple claws, empodium extended, widened distally; setae pv' and tc'' subequal and shorter than pv'' , all shorter than tc' ; setae u' and pl'' thin and smooth, pl'' longer than u' .

Description

Phoretic female: length of idiosoma 208 (169–208), width 141 (130–150).

Gnathosoma (Fig. 2): length of gnathosoma 16 (16–17), width 15 (14–15); Gnathosomal capsule almost as wide as long; dorsally with two pairs of subequal pointed and smooth cheliceral setae cha 11 (11–12) and chb 11 (11); subcapitulum with one pair of pointed and smooth subcapitular setae m 6 (6–7); palps compressed to gnathosomal capsule, dorsally bearing two smooth and pointed setae dGe 6 (6–7) and dFe 5 (5), ventrally with one large and conspicuous solenidion along with an accessory setigenous structure (*ass*), palps terminated with a tibial claw (these structures hardly visible because gnathosoma is bent and not shown on figure 2).

Idiosomal dorsum (Fig. 1): All tergites smooth; cupuli ia and ih visible on tergites D and H, respectively; all dorsal setae setiform and distinctly barbed; setae c_2 somewhat longer than and posterolaterally to c_1 ; setae c_2 with a sclerotized alveolar canal; setae e distinctly longer than and anterolaterally to setae f ; setae h_2 anterolaterally to setae h_1 ,

both subequal; length of dorsal setae: c_1 29 (26–29), c_2 34 (30–35), d 32 (29–31), e 44 (44–47), f 31 (28–31), h_1 51 (47–52), h_2 54 (51–57); distances between dorsal setae: c_1 - c_1 55 (52–57), c_2 - c_2 107 (100–101), c_1 - c_2 29 (25–30), d - d 73 (67–73), e - e 114 (110–125), f - f 43 (37–43), e - f 37 (37–43), h_1 - h_1 22 (20–23), h_2 - h_2 85 (81–90), h_1 - h_2 38 (34–38).

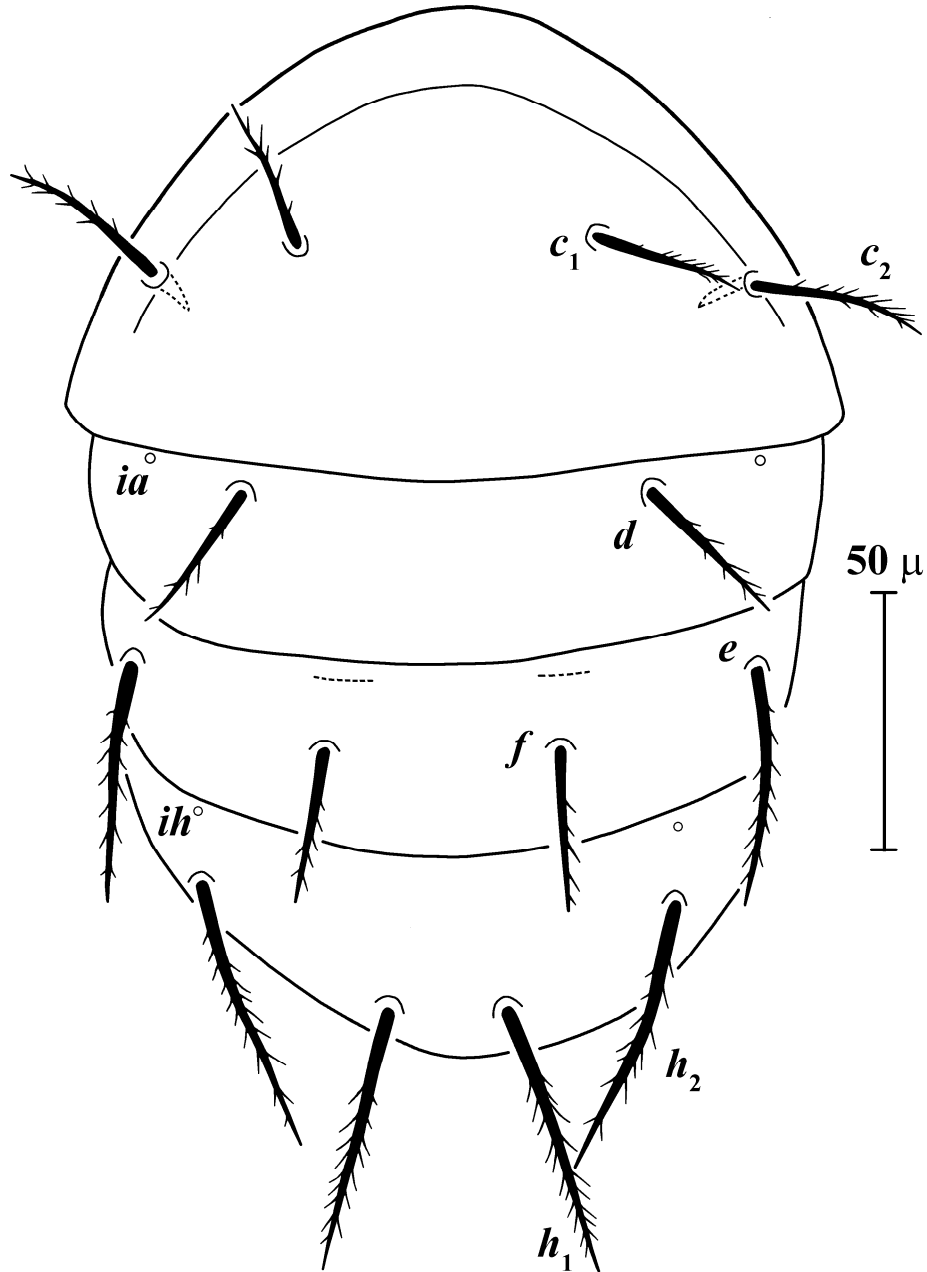


Figure 1. *Archidispus esfarayenicus* sp. nov. (female). Dorsum of idiosoma.

Idiosomal venter (Fig. 2): apodemes 1, 2 and sejugal (apšej) well developed and joined with presternal apodeme (appr); secondary transverse apodeme (Sta) crossing presternal apodeme posterior to apodeme 2; apodemes 3 and 4 well developed, the latter not reaching to trochanteres III; apodemes 5 short. Posterior margin of posterior sternal plate straight; Posterior margin of aggenital plate rounded. Setae 1a characteristically modified, dilated with an apical thorn; other setae of sternal plates setiform, smooth and

pointed. Setae ps_1 and ps_3 barbed, ps_3 longer than ps_1 , setae ps_2 smooth, much shorter than ps_1 and ps_3 . Length of ventral setae: $1a$ 6 (6–7), $1b$ 19 (18–22), $2a$ 14 (15–17), $2b$ 26 (24–27), $3a$ 22 (21–24), $3b$ 21 (21–24), $3c$ 23 (21–24), $4a$ 21 (20–23), $4b$ 34 (33–38), $4c$ 36 (34–38), ps_1 24 (21–23), ps_2 10 (9–11), ps_3 26 (26–33).

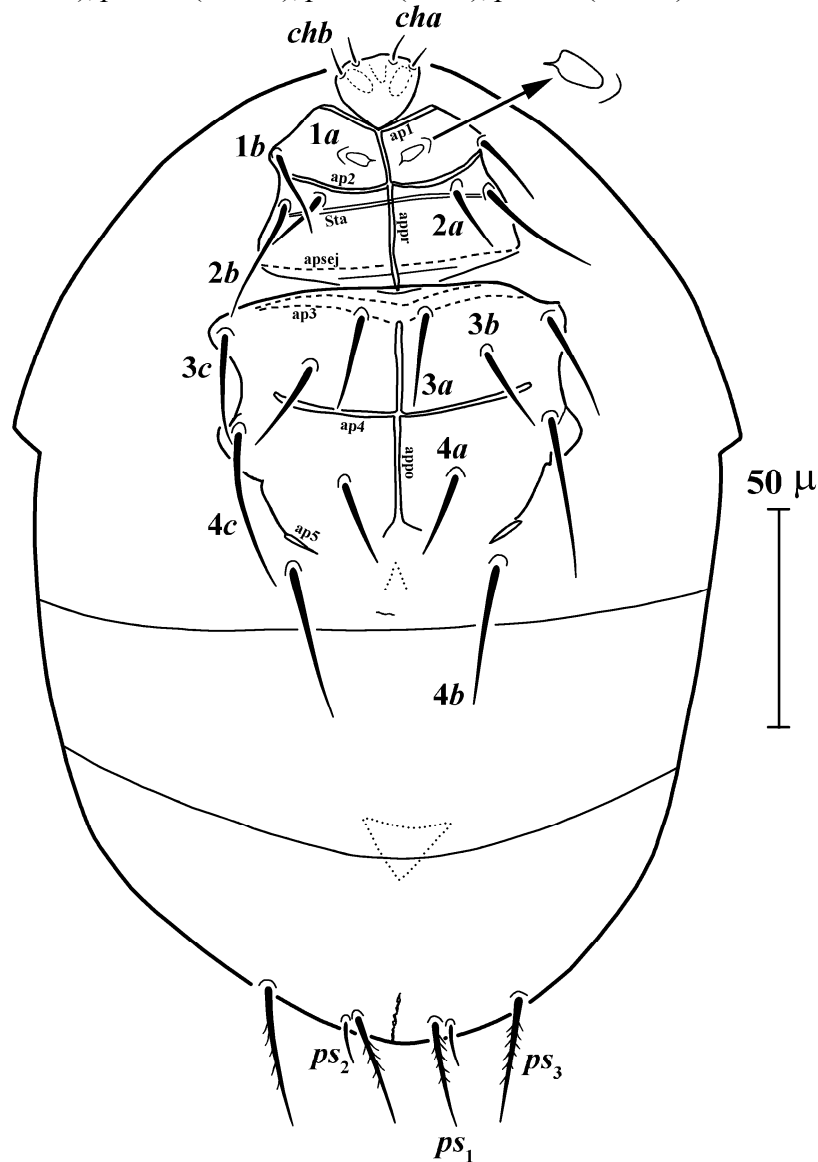
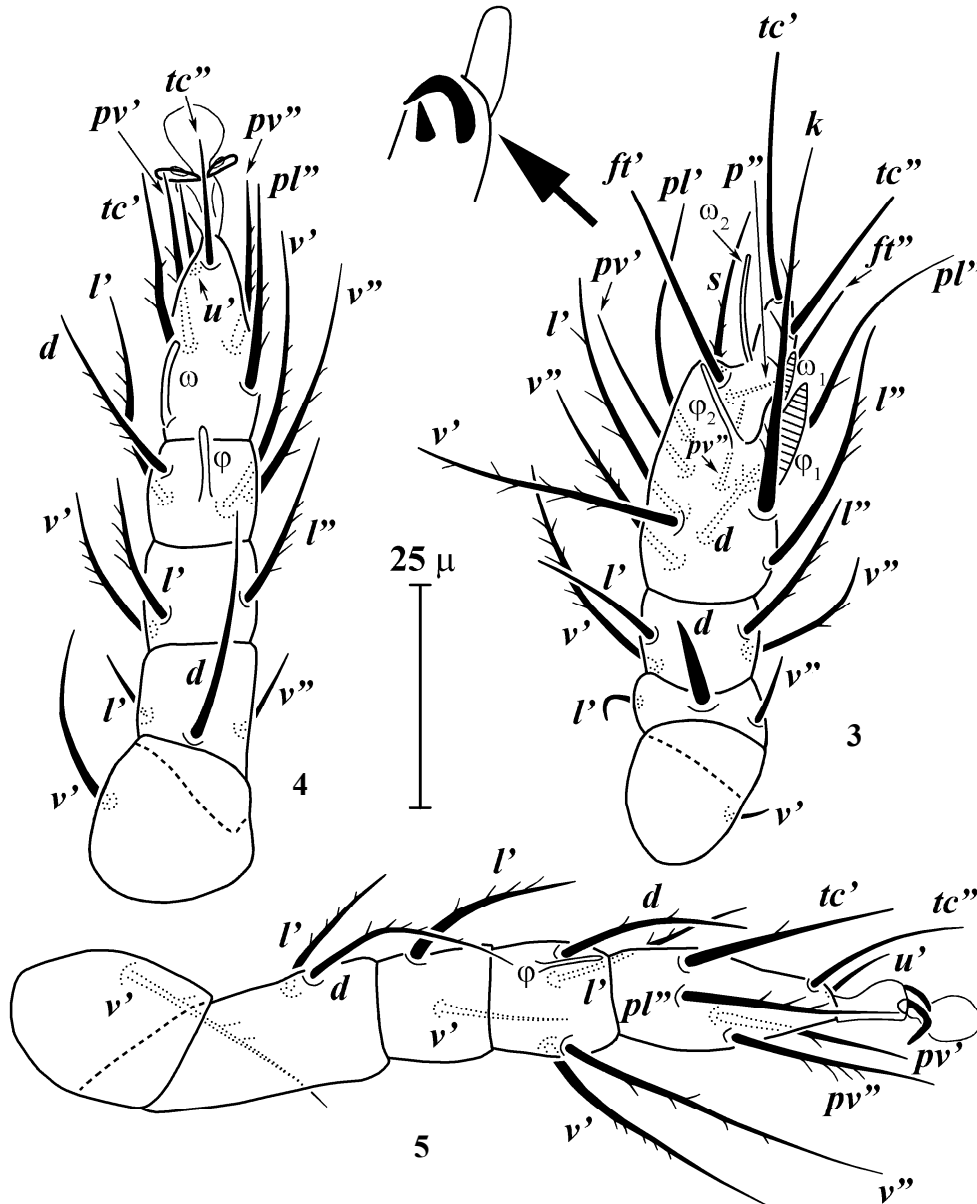


Figure 2. *Archidispus esfarayenicus* sp. nov. (female). Venter of idiosoma.

Legs (Figs. 3–6), leg I (Fig. 3): setal formula (number of solenidia in parentheses): 1-3-4-16(4); shorter than other legs; with one large ventrodiscal claw. Tibiotarsus: with five blunt-ended eupathidial setae p'' , tc' , tc'' , ft' and ft'' ; tc' and tc'' located on a distinct pinnaculum; other setae barbed except pl' ; solenidion ω_1 11 (10–12) finger shaped; solenidia ω_2 13 (12–13) and φ_2 10 (10–12) homomorph, uniformly thin; solenidion φ_1 11 (10–12) prominent, well-developed and finger shaped. Genu: setae of the segment barbed except l' ; setae v' longer than other setae. Femur: seta d leaf-like; setae v'' and l' smooth. Trochanter: seta v' smooth and shorter than femoral setae v'' and l' .

Leg II (Fig. 4); setal formula: 1-3-3-4(1)-6(1); with one pair of padded claws and empodium. Tarsus: seta u' and tc'' smooth, other setae barbed; solenidion ω 8 (8–9) uniformly thin. Tibia: all setae of the segment barbed; setae v' longer than other setae; solenidion ϕ 8 (8–9) uniformly thin. Genu: all setae of the segment barbed; setae v' and l' subequal and shorter than l'' . Femur: all setae of the segment smooth; seta l' shorter than v'' , both distinctly shorter than d . Trochanter: seta v' smooth and distinctly longer than femoral setae v'' and l' .



Figures 3–5. *Archidispus esfarayenicus* sp. nov. (female). 3. Leg I and ventrodistal of tibiotarsus I showing claw-apparatus; 4. Leg II; 5. Leg III.

Leg III (Fig. 5); setal formula: 1-2-2-4(1)-6; with one pair of padded claws and empodium. Tarsus: seta u' and tc'' smooth, other setae barbed. Tibia: all setae of the segment barbed; setae l' and d subequal and shorter than v' ; setae v'' distinctly longer than v' ; solenidion ϕ 7 (7–8) uniformly thin. Genu: seta v' smooth, l' barbed, l' longer than v' . Femur: seta d much longer than l' , both barbed. Trochanter: seta v' barbed.

Leg IV (Fig. 6); setal formula: 1-2-1-3(1)-6. Tarsus: with pretarsus and two small simple claws, empodium extended, widened distally; setae *tc'*, *tc''*, *pv'* and *pv''* distinctly barbed, setae *pv'* and *tc''* subequal and shorter than *pv''*, all shorter than *tc'*; setae *u'* and *pl''* thin and smooth, *pl''* longer than *u'*. Tibia: all setae barbed; setae *v'* and *l'* subequal, both longer than *d*; solenidion ϕ 11 (10–13) uniformly thin. Genu: seta *v'* barbed, subequal to tibial seta *d*. Femur: seta *d* distinctly barbed and longer than *v'*. Trochanter: seta *v'* barbed.

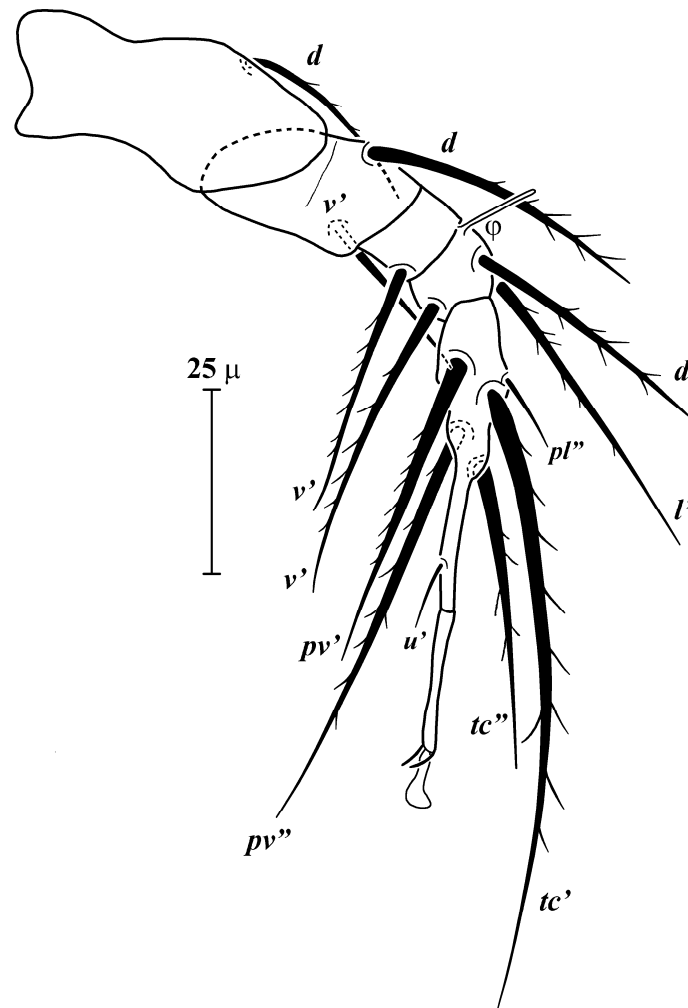


Figure 6. *Archidispus esfarayenicus* sp. nov. (female). Leg IV.

Nonphoretic female, male and larva unknown.

Type material

Holotype phoretic female and 15 paratypes (HH20070626-1) found in vicinity of Esfarayen city, North Khorasan province, northeastern Iran, (36° 94' N, 57° 73' E, 1483m a.s.l.), from under elytra of *Elaphropus (Tachyura) diabrachys* (Kolenati, 1845) (Coleoptera: Carabidae: Trechinae), collected by Hamidreza Hajiqaanbar, 26 June 2007.

Etymology

The specific epithet refers to the name of city Esfarayen (located in North Khorasan province, northeastern Iran), type locality of the new species.

Remarks

Among all species of the genus *Archidispus*, the phoretic female of the new species is most easily separated by presence of only one pair of modified setae (1a) in ventral aspect of idiosoma. These setae are characteristically dilated thoroughly with an apical thorn.

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نخستین گزارش از جنس *Archidispus* (Acari: Scutacaridae) از ایران همراه با توصیف گونه‌ای جدید

حمیدرضا حاجی‌قنبر و آلکساندر خاستوف

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چکیده

کنه *Archidispus esfarayenicus* Hajiqanbar & Khaustov **sp. nov.** (Acari: Heterostigmatina: Scutacaridae) جمع‌آوری شده از زیر بالپوش سخت‌بالپوش کارابید *Elaphropus (Tachyura) diabrachys* (Kolenati, 1845) (Coleoptera: Carabidae) از ایران توصیف و ترسیم می‌شود. گونه جدید از دیگر گونه‌های هم‌جنس خود با موی به طور مشخص تغییر یافته *1a* که سراسر پهن بوده و در نوک به خار تبدیل شده است، قابل تشخیص می‌باشد. این، نخستین گزارش از جنس *Archidispus* از ایران است.

واژگان کلیدی: کنه، سخت‌بالپوش، *Archidispus*، Scutacaridae، Heterostigmatina، Carabidae.

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