

## A re-evaluation of the ascomycetous genus *Solenopezia*\*

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A strong superficial resemblance between the predominantly North American discomycete *Solenopezia solenia* and the predominantly European arctic-alpine species *Niveostoma leucostoma* led to a critical reexamination of specimens and the conclusion that the two species are congeneric. *Solenopezia* is retained as having priority over the recently proposed genus *Niveostoma*, and a new combination, *Solenopezia leucostoma* is proposed.

Keywords: Ascomycetes, Discomycetes, taxonomy, morphology, distribution.

*Solenopezia solenia* (PECK) SACC. is among the most distinctive species of Hyaloscyphaceae. It was taken up by SACCARDO (1889) in his new genus, *Solenopezia*, which was erected for small, sessile, hairy, pigmented discomycetes with 1-septate spores. *Solenopezia sensu* SACCARDO was an artificial assemblage of 7 species in the section Hyalodidymae of the family Pezizeae. Most had little in common beyond their two-celled spores. SEAVER (1930) retained the genus only for *S. solenia*, which he named as type. He removed *S. vulpina* (COOKE) SACC. as a synonym of the common *Nectria peziza*, but failed to mention the other 5 original species of SACCARDO's genus.

NANNFELDT (1932) accepted SEAVER's decision, even though Nannfeldt treated *Solenopezia* as a synonym of *Lachnum* and *Lachnella* respectively. The resemblance of *S. solenia* and *Dasyscyphus leucostomus* was noted by HUHTINEN (1984), but until one of the authors (JHH) had been able to collect both species in their native habitats their congeneric nature was not realized.

*Solenopezia* is accepted here in the sense of its most current use (HAINES, 1989; RAITVIIR, 1973). It is placed in the Hyaloscyphaceae subfamily Trichopezizelloideae as defined by RAITVIIR (1987) and is related to *Trichopeziza* FÜCKEL and *Albotricha* RAITVIIR. It differs

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from other Hyaloscyphaceae in having a collar-like extension of the excipulum above the disc. It differs from other Hyaloscyphaceae in having a collar-like extension of the excipulum above the disc. The hymenium does not extend up the collar and the inner layers of excipulum give rise to short, seta-like hairs similar, in position, to hyphal outgrowths found in some Dermateaceous genera such as *Diplonaevia* Sacc. = *Merostictis* Clem. In this way the apothecium presents a characteristic white ring of hairs at the mouth of the cup.

*Solenopezia* SACC. – Syll. Fung. 8: 477, 1889.

= *Niveostoma* SVRČEK. – Česká Mykol. 42: 146. 1988.

Apothecia superficial, gregarious, sessile, soleniform to urceolate, darkly pigmented with pigmented hairs and high, collar-like, white, excipular margin which rises far above the disc. – Excipulum composed of angular to almost globose cells near the base, grading to prismatic near the margin. Excipular hairs cylindric to clavate, thick-walled, septate, brown at least in the lower portion, smooth or with sparse, coarse granules. Marginal hairs hyaline, thin-walled, septate, granulate and often tapered. Heavily granulate, tapered, hyaline hairs also occur on the interior of the raised margin. – Ascii cylindric with a tapered apex containing a J+ pore plug, with or without crozier at the base. – Ascospores fusiform to elliptical, septate or aseptate. – Paraphyses cylindrical. – So far known only from the dead stems of herbaceous plants.

#### Key to species of *Solenopezia*

- Excipular hairs clavate, spores 3.0–3.5  $\mu\text{m}$  wide, species of low elevation habitat, Eastern North America and Soviet Far East . . . . . *S. solenia*  
 Excipular hairs cylindrical, spores 1.5–2.0  $\mu\text{m}$  wide, species of arctic/alpine habitat, mostly European . . . . . *S. leucostoma*

*Solenopezia solenia* (PECK) SACC. – Syll. Fung. 8: 477. 1889. – Fig. 1, 3.

Bas.: *Peziza solenia* PECK. – Bull. Buff. Soc. Nat. Sci. 1: 70. Jun 1873.

= *Lachnella solenia* (PK.) SEAVER. – N. Amer. Cup-fungi (inoperculates). p. 260. 1951.

= *Dasyscyphus solenia* (PK.) DENNIS. – Kew Bull. 17: 364. 1963.

= *Belonidium solenia* (PK.) RAITV. – Scripta mycol. 1: 50. 1970.

Apothecia as in the generic description, soleniform 0.2–0.3 mm diam., dark brown to black brown, often with a slight purple tint

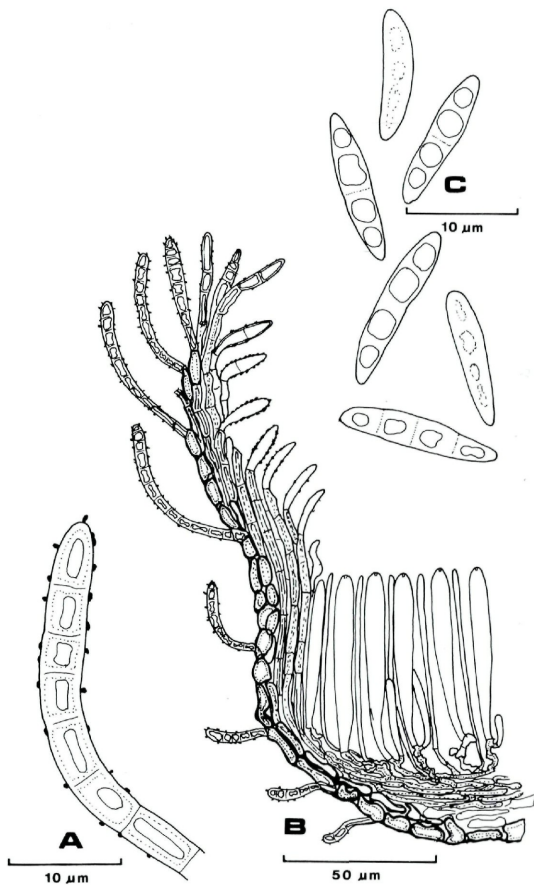


Fig. 1. - *Solenopezia solenia*. - a. Excipular hair in lactophenol mount. - b. Section through apothecium showing position of the hairs on the inner collar. - c. Spores in water mount. - a and c from type specimen; b from Реск, Big Indian collection.

and a thin white fringe of short hairs at the margin and on its inner edge. Disc deeply concave, cream to light brown. – Ectal excipulum 2–4 cells thick, brown, slightly thick-walled, and externally granulate *textura angularis* at the base of the cup ranging to *textura prismatica* near the margin. – Hairs of three types. Excipular hairs 40–60 (–100)  $\mu\text{m}$  long, clavate, 3.0–4.5  $\mu\text{m}$  below, expanding to 4.5–6.0  $\mu\text{m}$  above, usually curved, thick-walled, coarsely to sparsely granulate to nearly smooth, brown below becoming hyaline in the upper portion, closely septate forming very short cells which are almost as wide as long, outer walls slightly constricted at septa, cell contents pigmented and often releasing violaceous pigment in 3% KOH. Marginal hairs up to 45  $\times$  5  $\mu\text{m}$ , cylindrical or tapered, straight, thick-walled, hyaline, septate, cells longer than in marginal hairs, roughened. Hairs on the inner side of the marginal collar up to 25  $\times$  5  $\mu\text{m}$ , tapered toward apex and base, curved at base, thin-walled, hyaline, usually without septa, strongly encrusted externally with water soluble granules. – Ascii (62)–70–85(–95)  $\times$  7.0–9.5  $\mu\text{m}$ , cylindrical with a slightly conical apex, altered at the base, usually subtended by a crozier, apical pore evident even in unstained preparations, blue in IKI with or without KOH pretreatment, 8-spored. – Ascospores (12.5–) 14–17  $\times$  3.0–3.5  $\mu\text{m}$ , fusiform elliptic, slightly broader in the upper portion, usually non-septate but occasionally 1–3 septate, containing 2–4 spherical inclusions, rarely becoming yellowish with age. – Paraphyses 2–3  $\mu\text{m}$  diam., cylindrical with narrowly clavate tips, not superseding the asci by more than a few  $\mu\text{m}$ , in some cases proliferating with new growth after maturity.

Hosts. – *Eupatorium maculatum* L., *E. purpureum* L. and *E. rugosum* HOUTT. On dead stems from previous year in moist areas.

Range. – USA: New York. USSR: a single collection from Sakhalin Island, Soviet Far East. All known collections are from below 500 m elev.

Material examined. – NORTH AMERICA, U.S.A., NEW YORK: on *Eupatorium ageratoides* (= *E. rugosum*), Schuyler Co., Watkins Glen, ca. 300m, Sept. 1871, C.H. PECK, Holotype (NYS) (Isotypes in NY, K, CUP-D); on *Eupatorium ageroides* (= *E. rugosum*), Ulster Co., Big Indian, „Catskills“, ca.400m, Sept. 1877, C.H. PECK (NYS, BUF) also distributed as J.B. ELLIS, North Amer. Fungi no 384 and F. DE THÜMEN, Mycoth. Univ. no 1114; on *Eupatorium purpureum*, Essex Co., Newcomb, „Adirondacks“ ca. 400m, 14.9.1925, H.D. HOUSE no 1115 (NYS); on *Eupatorium maculatum*, Herkimer Co., swamp 1 mi. S. of Cedarville, ca. 400m, 10.9.1970, J.H. HAINES no 1509, S.J. SMITH & K.P. DUMONT (NYS); on *Eupatorium maculatum*, Herkimer Co., cedar grove 1 mi S of Jordanville, ca. 400m, 10.9.1970, J.H. HAINES no 1517, S.J. SMITH & K.P.DUMONT (NYS); on *Eupatorium maculatum*, Schyler Co., Hendershot Gulf near Alpine, ca. 400m, 19.10.1970, J.H. HAINES no 1551, on Peck Foray (NYS); on *Eupatorium maculatum*, Schyler Co., Arnot Forest Camp SW of Ithaca, under 500m, 20.9.1970, J.H. HAINES no 1563, on Peck Foray (NYS); on *Eupatorium* sp., (no collection data but believed to be from Poughkeepsie, New York ca. 1860) W.R. GERARD, as *Peziza eupatorii* SCHW., Durand herbarium no 81–40, (CUP-D); on *Eupatorium maculatum*, Rensselaer Co., N side of Lake Myosotis, E.N.Huyck Preserve, Rensselaerville, ca

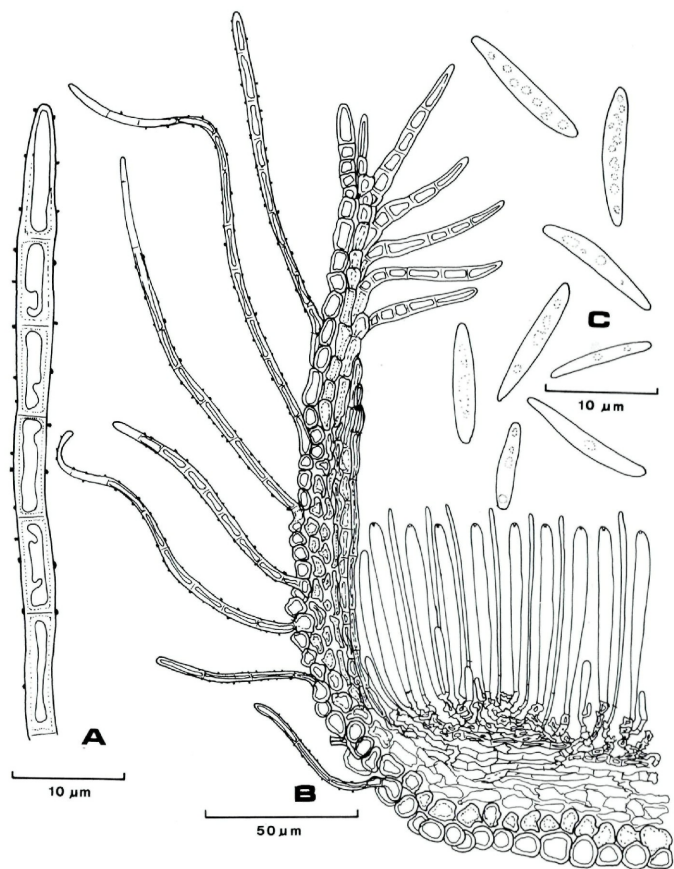


Fig. 2. – *Solenopezia leucostoma*. – a. Excipular hair in lactophenol mount. – b. Section through apothecium showing position of the hairs on the inner collar. – c. Spores in water mount. – All from JHH 4508.

450m, 5.9.1989, J.H. HAINES no 4169 (NYS); ASIA, U.S.S.R., on unidentified herbaceous stem, Sakhalin Island, Kuznetsovo, „Oriens extremis“ 12.9.1979, A. KOLLOM (TAA 112768); on dead stems of *Cacalia* sp., the Primorsk Region, distr. Chuguyevsk, Bulyga-Fadeevo, 11.9.1975, B. KULLMAN (TAA no 68437)

All known collections where the elevation was recorded were made below 500 m elevation. *S. solenia* is possibly restricted to *Eupatorium* sp. and apparently with a distribution in Eastern North America and the Soviet Far East. It should be sought throughout the range of *Eupatorium* spp., particularly along the Pacific rim. All collections were made in September, and it may have a short fruiting period limited to the fall. The outward appearance of *S. solenia* is very similar to that of *S. leucostoma*, but when they are viewed side by side, the former is slightly smaller, tube-shaped, and often with a purple tinge. Microscopically *S. solenia* is easily identified by its closely septate, clavate hairs and wider spores. Spore septation, which was given so much importance by SACCARDO, is fairly rare and occurs after spore discharge in most specimens. The spores of one specimen, „PECK, Big Indian“, became slightly yellowish after discharge.

*Solenopezia leucostoma* (REHM) RAITVIIR, HAINES & MÜLLER comb. nov. – Figs. 2, 3.

- Bas.: *Dasyscypha leucostoma* REHM. – Ber. Naturhist. Vereins Augsburg 26: 53. 1881.  
 = *Niveostoma leucostoma* (REHM) SVRČEK. – Česká Mykol. 42: 146. 1988.  
 = *Belonidium leucostoma* (REHM) RAITVIIR. – Scripta Mycol. 1: 48. 1970.

Apothecia as in the generic description, 0.25–0.40 mm diam., sessile, urceolate to soleniform, brown to blackish brown, covered by dark hairs, with a raised collar lined internally with a white fringe and sometimes with hair-like hyphae adhering to the substrate. – Ectal excipulum thin, 2–4 cell thick, of darkly pigmented isodiametric cells 8–10 X 6–8  $\mu$ m at the base forming *textura angularis* grading to *textura prismatica* toward the margin. Medullary excipulum of hyaline, dense *textura intricata*. – Excipular hairs abundant on sides of apothecium, up to 200 x 2.0–3.0  $\mu$ m, cylindrical with hemispherical tips, flexuous or curved, thick-walled, septate, forming cells 3–8 times as long as broad, the first two basal cells often wider and more heavily pigmented, smooth or with sparse, coarse granules, pigmented at least in the lower portion, often fading to hyaline above, iodidotic in 3% KOH. – Marginal hairs up to 60 x 4–6  $\mu$ m, tapered or fusoid, straight, thin-walled, hyaline or lightly pigmented at the base, septate, sparsely granulate. – Hairs of the

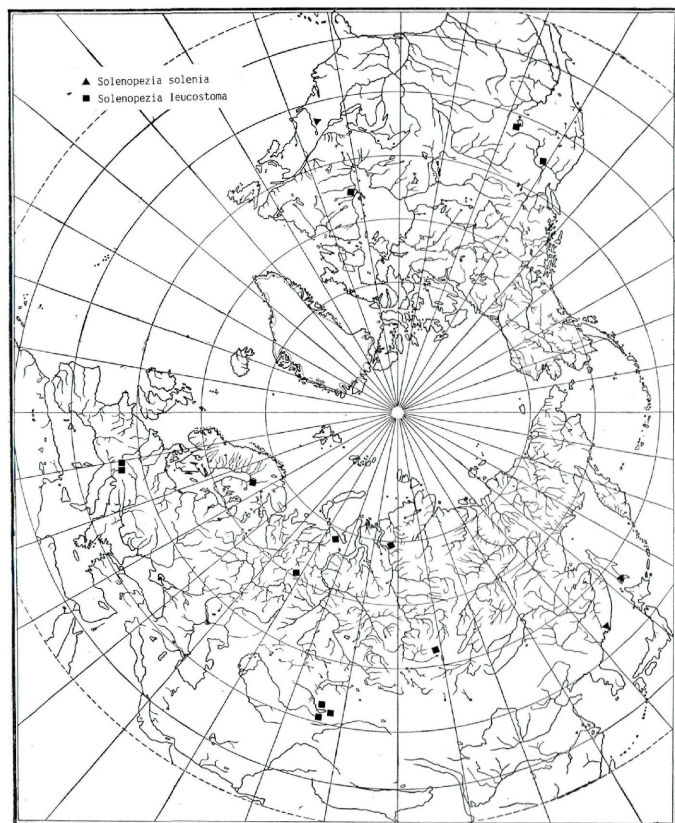


Fig. 3. - Geographic distribution of recorded collections of *S. solenia* and *S. leucostoma*.

inner collar up to  $75 \times 5-7 \mu\text{m}$ , thin- to thick-walled, 3-6 septate, hyaline throughout, conical to cylindrical. – Ascii (55-)70-90(-110)  $\times$  5-7  $\mu\text{m}$ , cylindrical with conical apex, apical pore visible in untreated preparations, blue in IKI, 8-spored. – Ascospores (7.5-)10.5-14.8(-18.5)  $\times$  1.5-2.0  $\mu\text{m}$ , cylindric-ellipsoid to subfusoid, often slightly inequilateral, non-septate or with a median septum, sometimes septate while still in the ascus, hyaline, without conspicuous inclusions after drying and mounting in lactophenol or KOH. – Paraphyses 1.2-2.0  $\mu\text{m}$  diam, cylindrical, not superseding the asci by more than a few  $\mu\text{m}$ .

Hosts. – *Aconitum*, *Actaea*, *Adenostyles*, *Cichorium*, *Cirsium*, *Epilobium*, *Geum*, *Heracleum*, *Mertensia*, *Peucedanum*, *Rumex*, *Thalictrum*, and probably other herbaceous plants. It has been collected once from *Populus*. The apothecia are found on the previous years dead stems which are in very moist conditions.

Range. – Middle Europe, Southern U.S.S.R. and Northern U.S.A. It occurs only in the alpine and arctic regions: all known collections were above 1600 m. Collections from Northern Canada and Finland are from lower elevations, but are also closer to the arctic.

Specimens examined. – Rabenhorst-Winter, Fungi Europaei no. 3574 (as *Dasyscypha leucostoma* REHM; Linhart, Fungi Hungarici no. 287 (as *Dasyscypha leucostoma* REHM; DE THÜMEN, Mycotheca Universalis no. 610 (as *Tapesia leucostoma* REHM). – SWITZERLAND: on *Aconitum paniculatum* LAM., Alps, Engadin, Zuoz, Val Arpiglia, ca.1700 m, 18.7.1972, E. MÜLLER (ZT); on *Adenostyles alliariae* (GOUAN) KERNER, Alps, Engadin, Zuoz, Val Arpiglia, ca. 1700 m, 6.9.1990, J. HAINES, A. RAITVIIR, E. MÜLLER & al., JHH 4469 (NYS); on *Aconitum „napellus“*, auct. (Probably *A. compactum* REICHENB.) Engadin, Scuol, Val Mingèr, ca. 1800 m, 3.8.1972, P. RASCHLE (ZT); on *Peucedanum ostruthium* (L.) KOCH, Alps, Engadin, Zuoz, Val Arpiglia, ca. 1750 m, 6.9.1990, J. HAINES, A. RAITVIIR, E. MÜLLER & al., JHH 4470 (NYS); on *Cirsium spinosissimum* (L.) SCOP., Alps, Albulapass, ca. 2200 m, 25.8.1980, E. MÜLLER (ZT); on unidentified Apiaceae, Alps, Albulapass, Val digl Diavel, ca. 2100 m, 9.9.1990, J. HAINES, A. RAITVIIR, E. MÜLLER & al., JHH 4508 (NYS); on *Epilobium angustifolium* L., Alps, Engadin, Val Susasca, Rôven, ca. 1800 m, 5.9.1989, E. MÜLLER (ZT); on *Epilobium angustifolium* L., Alps, Albulapass, above Weissenstein, ca. 2050 m, 21.9.1989, E. MÜLLER (ZT); on *Rumex arifolius* ALL., Alps, Engadin, Val Susasca, Rôven, ca. 1800 m, 12.9.1989, E. MÜLLER (ZT); on *Adenostyles alliariae* (GOUAN) KERNER, Alps, Albulapass, 1970, P. RASCHLE (ZT). – ITALY: on *Epilobium angustifolium* L., Trentino Alps, Val Cadino, ca. 1700 m, 16.9.1989, A. RAITVIIR (TAA). – FINLAND: on *Geum rivale* L., Kuusamo, Salla, ad flumen Kutsajoki, Pyhakuru, 26.7.1939, M. LAURILA (TUR). – U.S.S.R.: on unidentified herbaceous stems, Ural Mts., Sob' River Valley, Krasnyi Kamen', 28.7.1969, A. RAITVIIR, (TAA); on *Aconitum septentrionale* KOELLE, Ural Mts., Severouralsk, 28.7.1968, A. SIRKO (TAA); on unidentified Apiaceae, Ural Mts., Severouralsk, 26.7.1968, A. SIRKO (TAA); on *Aconitum septentrionale*, Ural Mts., Kytlym, 23.7.1973, A. RAITVIIR (TAA); on unidentified Apiaceae, Taimar Peninsula, Dudinka, 22.7.1967, P. PYLDMAA (TAA); on unidentified herbaceous plant, Tien-Shan Mts., Zailijski Alatau, Medao, ca. 1700 m, 26.6.1976, A. RAITVIIR (TAA); on unidentified Apiaceae, Tien-Shan Mts., Zailijski Alatau, Medeo, ca. 1700 m, 9.6.1968, A. RAITVIIR (TAA); on *Populus tremula* L., Tien-Shan Mts., Zailijski Alatau, Medeo, ca. 1600 m, A. RAITVIIR (TAA); on *Cichorium intybus* L., Tien-Shan Mts., Terskei Alatau, Teplokliuchenka, ca. 1800 m, A. RAITVIIR (TAA); on *Aconitum septentrionale*, Tien-Shan Mts., Terskei Alatau, Teplokliuchenka, ca. 1800 m, 7.6.1968,



A. RAITVIIR (TAA); on unidentified Apiaceae, Tien-Shan Mts., Terskei Alatau, Telokliuchenka, ca 1800 m, 7.6.1968, A. RAITVIIR (TAA); on *Thalictrum simplex* L., Tien-Shan Mts., Terskei Alatau, Teplokliuchenka, ca. 1800 m, 8.6.1971, B. KULLMAN (TAA); on *Epilobium* sp., Tien-Shan Mts., Naryntau, ca 2000 m, 20.6.1967, A. RAITVIIR (TAA); on *Aconitum curvirostre* (KRYL.) SERG. Altai Mts., distr. Shebalino, Seminski Pass, 1500–2000 m, 4.8.1977, A. KOLLOM (TAA). – CANADA: on *Heracleum lanatum* MICHX., Quebec, Kuujuarapik, Great Whale River (Poste-de-la-Baleine), 1.8.1982, S. HUHTINEN (TUR, TAA). – U.S.A.: on *Mertensia paniculata* (AIT.) G. DON, 1800–2100 m, Mt. Paddo, Washington, 19.9.1885, W.N. SUKSDORF no 229 (NY); on *Actaea arguta* NUTTAL, Wasatch Mts., E of Odgen, Utah, ca. 2000 m, 23.8.1973, C.T. ROGERSON no 4119 (NY, NYS).

*Solenopezia leucostoma* is an arctic-alpine species. All collections where the elevation was recorded were made between 1700 and 2300 m except for the HUHTINEN Canadian collection from above 55° N. It has a wide host range in comparison with *S. solenia* from which it can be distinguished by the cylindrical hairs with septa that form cells 3–8 times as long as broad and by the narrower spores. The apothecia of *S. leucostoma* are also larger and urceolate rather than soleniform. The peculiar collar structure in this species led SVRČEK (1988) to the erection of the new genus *Niveostoma* (*Leucostoma* being pre-occupied).

HUHTINEN (1984) compared *S. leucostoma* with *Belonidium cenangioides* (ELLIS) RAITVIIR, but that species which also has an arctic-alpine distribution differs in having thin-walled hairs and in lacking a collar with hairs. It may more properly belong in the genus *Trichopeziza*.

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