

A new species of *Psilocymbium* with the description of the male and new records of *P. lineatum* at South Brazil (Araneae: Linyphiidae)

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ABSTRACT. The Neotropical genus *Psilocymbium* Millidge, 1991 can be recognized by the presence of a non-flagelliform, rigid and spiral shaped embolus, the absence of a cymbial basal excavation on the palp (males), and by having prolonged spermathecae on the epigynum and strong pedipalp setae (females). In this paper *Psilocymbium antonina* **sp. nov.**, is described based on male and female specimens from the state of Paraná, southern Brazil. *Psilocymbium antonina* **sp. nov.** is diagnosed by the following combination of characters: prominent tibial apophysis with gauged distal projection, acute dorsal cymbial apex and acute cymbial proximal region of the palp (male); fertilization ducts distant from each other and the coiled copulatory ducts of the female epigynum. The male of *P. lineatum* (Millidge, 1991) is described and recorded for the first time in the states of Paraná and Rio Grande do Sul, Brazil.

KEY WORDS. Erigoninae; Neotropical; Paraná; Rio Grande do Sul; spider taxonomy.

Psilocymbium was proposed by MILLIDGE (1991) and includes small spiders with body size less than 2.5mm. Known exclusively from South America, it contains six species: *P. acanthodes* Miller, 2007 from Argentina, *P. defloccata* (Keyserling, 1886) from Peru, *P. incertum* Millidge, 1991 and *P. pilifrons* Millidge, 1991 from Colombia, *P. lineatum* (Millidge, 1991) and the type species *P. tuberosum* Millidge, 1991 from Brazil (PLATNICK 2009).

Males of *Psilocymbium* can be recognized by a non-flagelliform rigid and spiral shaped embolus; they can be distinguished from males of *Sphecozone* O.P.-Cambridge, 1870 by the absence of a cymbial basal excavation and from males of *Moyosi* Miller, 2007 by the raised carapace or post-ocular hump. Females are recognized by the prolonged spermathecae and strong palpal setae (MILLIDGE 1991, MILLER 2007).

The examination of specimens from the collection of the Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul allowed the recognition and description of a new species of *Psilocymbium* from the state of Paraná, as well as the description of the male of *P. lineatum*, recorded for the first time in the states of Paraná and Rio Grande do Sul, Brazil; the body and genital morphology of both species are illustrated.

MATERIAL AND METHODS

Specimens are deposited at the collection of the Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul (MCN, Erica H. Buckup), Porto Alegre, Rio Grande do Sul, Brazil.

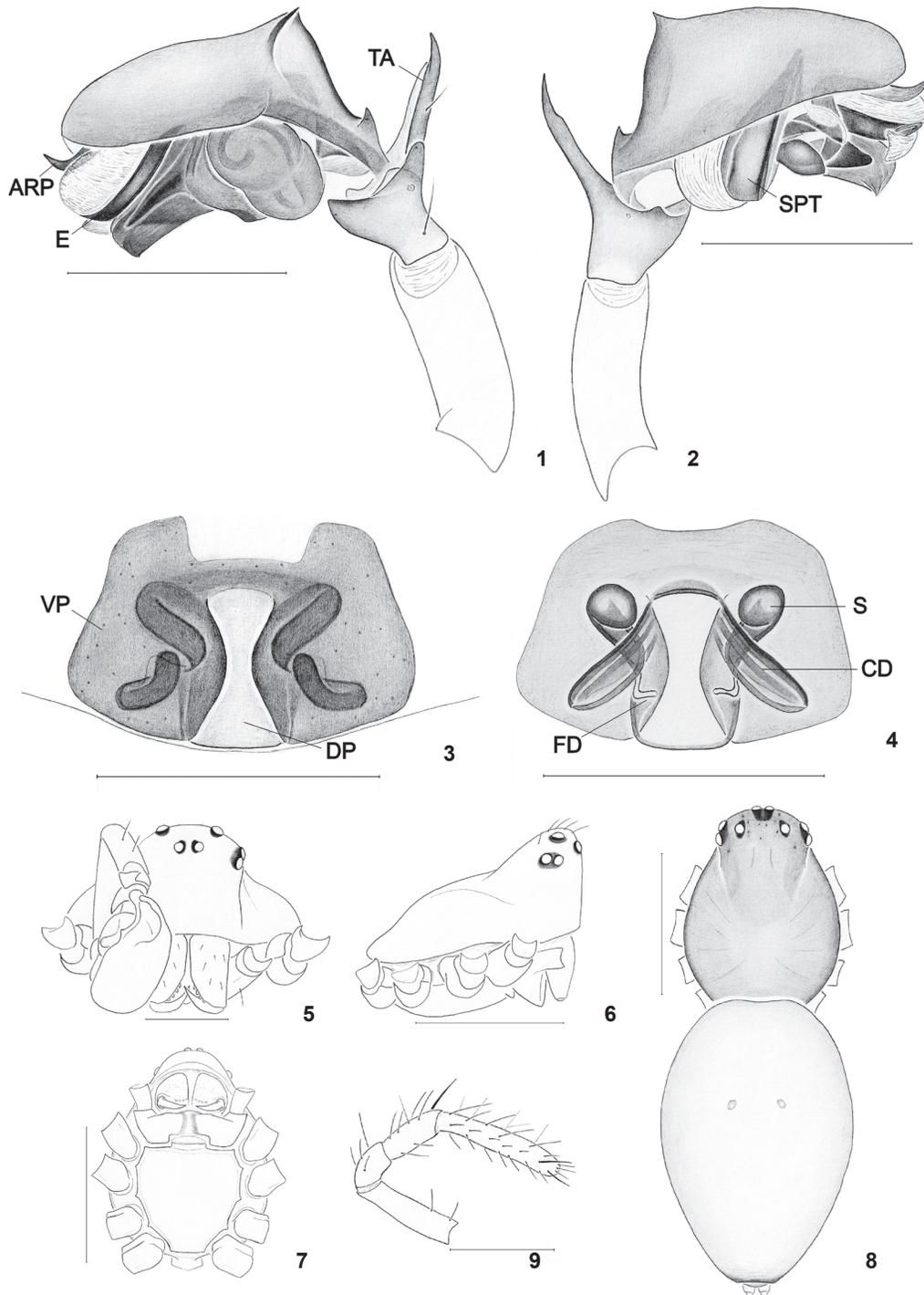
Specimens were illustrated using a Leica® MZ9.5 stereoscope with a camera lucida. Trichobothrium position on metatarsus I was calculated following DENIS (1949). The descriptions and the terminology of palpal morphology follow MILLIDGE (1991) and HORMIGA (2000). The tibial spine formula follows ROBERTS (1987). The study of reproductive structures of both male and female was performed by immersing the epigynum and the embolic division in lactic acid and/or clove oil for approximately 30 minutes until the internal structures could be perfectly visualized. For the expansion of structures the palp was immersed in 10% KOH for approximately two hours and after that immersed in filtered water. Measurements are expressed in millimeters. Abbreviations: (AME) anterior median eyes, (ALE) anterior lateral eyes, (PLE) posterior lateral eyes and (PME) posterior median eyes; (TmI) trichobothrium position on metatarsus I.

TAXONOMY

Psilocymbium antonina **sp. nov.**

Figs 1-9, 18

Types. Holotype male from Reserva Natural do Rio Cachoeira, Antonina, Paraná, Brazil, 21.IX.2007, E.S.S. Álvares *leg.*, deposited in MCN 44807. Paratypes: all same data and locality as holotype, 1 female (MCN 46391), 3 females (MCN 44742) and 1 female (MCN 44800), same collector as holotype; 1 female (MCN 44786), R. Ott *leg.*; 1 male (MCN 45780) and 1 female (MCN 45781), I. Czisauskas *leg.*



Figures 1-9. *Psilocymbium antonina* sp. nov. (1-2) Male palpus: (1) ectal view; (2) mesal view. (3-4) Female epygine: (3) ventral view, (4) dorsal view, cleared. (5-8) Male habitus: (5) frontal view of carapace; (6) lateral view; (7) ventral view, sternum detail; (8) habitus, dorsal view. (9) Female palp. (ARP) Anterior radical process, (CD) copulatory duct, (DP) dorsal plate, (DT) distal tooth of tibial apophysis, (E) embolus, (FD) fertilization duct, (TA) tibial apophysis, (S) spermatheca, (SPT) suprategulum, (ST) subtegulum, (T) tegulum, (VP) ventral plate. Scale bars: (1-4 and 9) 0,25 mm, (5-8) 0,5 mm.

Diagnosis. The male palp of *Psilocymbium antonina* sp. nov. resembles that of *P. tuberosum* Millidge, 1991 (MILLIDGE 1991: figs 785-787; MILLER 2007: figs 173a, b) by having an enlarged embolus with hooked tip (Figs 1 and 2), the anterior radical process projected and directed toward the cymbial apex, and a broad suprategulum (Fig. 2); it differs from the palp of *P. tuberosum* by the prominent tibial apophysis with gauged distal projection, acute dorsal cymbial apex and acute cymbial proximal region (Figs 1 and 2). The epigynum resembles that of *P. tuberosum* (MILLIDGE 1991: figs 789-790; MILLER 2007: figs 173e, 176c) in having a dorsal plate that is longer than wide (Fig. 3), and differs in the fertilization ducts, more separated from each other, the coiled copulatory ducts and the round spermathecae (Fig. 4).

Description. Male (MCN 44807): Total length 1.65. Carapace length 0.67, width 0.60, height 0.37. Clypeus height 0.25. Chelicerae length 0.22, width 0.12. Sternum length 0.38, width 0.40. Abdomen length 0.97, width 0.65, height 0.62. Leg formula IV/II/I/III. Leg lengths (I/II/III/IV): femur 0.62/0.63/0.53/0.68; patella 0.18/0.18/0.16/0.17; tibia 0.62/0.60/0.41/0.58; metatarsus 0.52/0.52/0.41/0.53; tarsus 0.30/0.33/0.26/0.31; total: 2.24/2.26/1.77/2.27. Coxa IV basis well appart from each other (0.17). Palp (femur, patella, tibia, cymbium): 0.40/0.23/0.23/0.34. Tm I 0.69. Metatarsus I-III with trichobothrium, IV absent. Tibial spine formula: 0-0-1-1. Eye diameters and interdistances: AME 0.03, ALE 0.03, PME 0.03, PLE 0.03; AME-ALE 0.10, PME-PLE 0.06, AME-AME 0.02, PME-PME 0.12. Anterior eye row 0.31, posterior row 0.32. Small eyes with dark borders (Figs 5, 6 and 8). Clypeus remarkably high, not pubescent (Figs 5 and 6). Carapace anteriorly projected, yellowish-brown, setae present only at ocular area (Fig. 6). Chelicerae yellowish-brown, scarce frontal setae. Promargin with four very small teeth and retromargin with two teeth. Endites yellowish-brown. Sternum yellowish-brown with reddish-brown borders, pubescent, posteriorly truncated, wider as long (Fig. 7). Coxa yellowish-brown, III slightly smaller. Legs brown, femura distally and whole patella and tibia with dark-brown pigmentation. Abdomen longer than wide, oval, longitudinal stripe absent, yellowish-white dorsal and ventral portions, pigmentation around spinnerets, remarkably pubescent (Fig. 8). Spinnerets yellowish-brown. Colulus well developed. Palp femur with basal tubercle. Embolic membrane close to apex of embolus on mesal view, suprategulum with sharp apex and below cymbial margin, strong and elongated patella (Figs 1 and 2).

Female (MCN 46391): Total length 1.77. Carapace length 0.67, width 0.57, height 0.22. Clypeus height 0.15. Chelicerae length 0.20, width 0.10. Sternum length 0.38, width 0.40. Abdomen length 1.12, width 0.72, height 0.65. Leg formula IV/II/I/III. Leg lengths (I/II/III/IV): femur 0.62/0.66/0.52/0.70; patella 0.18/0.18/0.18/0.18; tibia 0.55/0.56/0.35/0.56; metatarsus 0.50/0.50/0.38/0.52; tarsus 0.33/0.35/0.27/0.32; total: 2.18/2.25/1.70/2.28. Coxa IV very distant (0.20). Palp (femur, patella, tibia, tarsus): 0.18/0.11/0.13/0.22. Palpal tibia and tarsus

with macrosetas (Fig. 9). Tm I 0.67. Metatarsus I-III with trichobothrium. The tibial spine formula: 1-1-1-1. Eye diameters and interdistances: AME 0.02, ALE 0.05, PME 0.05, PLE 0.05; AME-ALE 0.06, PME-PLE 0.05, AME-AME 0.02, PME-PME 0.06. Anterior eye row 0.25, posterior row 0.27. Eyes as in male. Clypeus high, not pubescent. Cephalotorax yellowish-brown with pale medial area, not pubescent. Chelicerae yellowish-brown, frontally pubescent. Promargin with four teeth and retromargin with two teeth. Endites yellowish. Sternum yellowish with brown borders, pubescent, truncated, wider than long. Coxa yellowish, III slightly smaller. Legs brown, femura distally and patella and tibia dark red-brown. Abdomen longer than wide, oval, without black longitudinal stripe, white-yellowish dorsal and ventral portions; pigmentation around spinnerets, remarkably pubescent. Colulus as in male. Epigynum with long copulatory ducts, short fertilization ducts, spermathecae at median-anterior position, rounded (Fig. 4).

Additional material examined. BRAZIL, Paraná: Antonina (Reserva Natural do Rio Cachoeira), 1 female, 21.IX.2007, pitfall-trap leg. (MCN 45805).

Distribution. Only known from the type locality in Paraná, Brazil.

Etymology. The species epithet, in apposition, refers to the type locality.

Natural history. Collected with beating tray at bush and tree vegetational strata and in litter with pitfall-traps, all at Atlantic Forest areas.

Psilocymbium lineatum (Millidge, 1991)

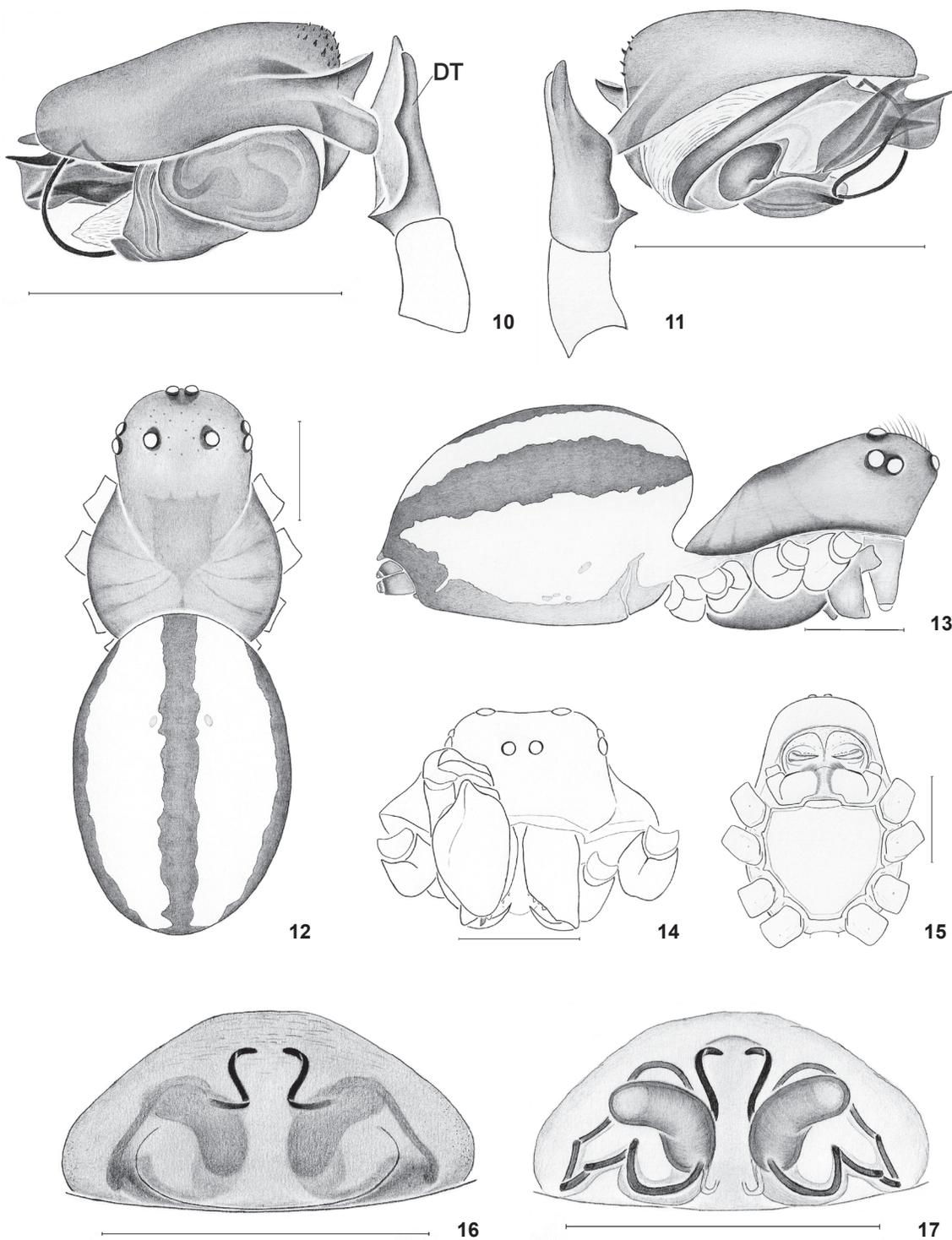
Figs 10-18

Gilvonanus lineatus Millidge, 1991: 132, figs 533-534 (Holotype female from Campo das Antas, Teresópolis, Rio de Janeiro, Brazil, deposited at AMNH, not examined); Platnick, 1993: 279; 2009.

Psilocymbium lineatum: Miller, 2007: 229, fig. 176d.

Diagnosis. The male palp of *Psilocymbium lineatum* (Millidge, 1991) (Figs 10 and 11) resembles that of *P. acanthodes* Miller, 2007 (see MILLER 2007: 172a, b, 174a-f), in having prolonged embolus with distal loop and a distal tooth at the tibial apophysis (Fig. 10); it differs from the male palp of the latter by having a dorsal projection at the base of cymbium with additional spines at the dorsal portion (Figs 10 and 11) and tibial apophysis straight, bearing a poorly developed distal tooth. The epigynum differs from that of *P. acanthodes* (MILLER 2007: 172c, h; 176b) by lacking the anterior process on the ventral epyginal plate (Fig. 16) and by the kidney-shaped, curved spermathecae (Fig. 17).

Description. Male (MCN 46392): Total length 1.40. Carapace length 0.65, width 0.47, height 0.27. Clypeus height 0.15. Chelicerae length 0.17, width 0.10. Sternum length 0.30, width 0.33. Abdomen length 0.80, width 0.52, height 0.55. Leg formula IV/I/II/III. Leg lengths (I/II/III/IV): femur 0.38/0.38/0.31/



Figures 10-17. *Psilocymbium lineatum*. (10-11) Male palpus: (10) ectal view, (11) mesal view. (12-15) Male habitus: (12) dorsal view; (13) lateral view; (14) frontal view; (15) ventral view, sternum detail. (16-17) Epyginum: (16) ventral view; (17) dorsal view, cleared. Scale bars: 0,25 mm.



Figure 18. Map showing the distribution of *Psilocymbium antonina* sp. nov. (□) and *P. lineatum* (■) in Brazil.

0.42; patella 0.16/0.13/0.11/0.13; tibia 0.31/0.32/0.22/0.35; metatarsus 0.26/0.25/0.22/0.26; tarsus 0.27/0.26/0.23/0.25; total: 1.38/1.34/1.09/1.41. Coxa IV well apart from each other (0.21). Palp (femur, patella, tibia, cymbium): 0.25/0.21/0.13/0.28. Tm I 0.64. Metatarsus I-III with trichobothrium, IV absent. The tibial spine formula: 0-0-1-1. Patella I and II with macrosetae distal. Eye diameters and interdistances: AME 0.03, ALE 0.05, PME 0.05, PLE 0.05; AME-ALE 0.12, PME-PLA 0.06, AME-AME 0.02, PME-PME 0.12. Eyes with black borders (Figs 12 and 13). Clypeus not pubescent (Fig. 14). Carapace anteriorly projected (Fig. 15). Cephalotorax brown with dark-brown borders and medial area, projected at cephalic area, pubescent at ocular area, smooth posteriorly. Chelicerae brown. Promargin with four teeth and retromargin with two. Endites brown with dark-brown dots. Sternum brown with dark-brown dots, slightly pubescent, truncated (Fig. 15), wider than long. Coxae yellowish-brown, dark-brown dotted distal borders, III slightly smaller. Legs yellowish-brown. Abdome longer than wide, oval, whitish-yellow with enlarged black medial longitudinal stripe and similar lateral stripes all extending from over the pedicel until spinnerets; whitish-yellow venter with broad pigmented medial area also pigmented around spinnerets, highly pubescent.

Spinnerets brown. Colulus well developed. Palp with long coiled embolus, tegulum with ventral prominence, suprategulum gauged with sharp tip located below cymbium border, tibia dorsally enlarged (Figs 10 and 11).

Female. Described by MILLIDGE (1991: 131, 132) and MILLER (2007: 229, 230). Illustrations from specimen MCN 46392 (Figs 16 and 17).

New records. BRAZIL, *Paraná*: Guaraqueçaba (Reserva Natural da Serra do Itaquí), 1 female, 18.IX.2007, E.S.S. Álvares leg. (MCN 45679); *Rio Grande do Sul*: Cristal (Mata ciliar do Rio Camaquã, 31°01'01.7"S, 51°56'42.0"W), 1 male, 1 female, 19.XII.2007, E.N.L. Rodrigues leg. (MCN 46392), Arroio Grande (Mata ciliar do Rio Piratini, 31°54'06.47"S, 52°39'08.29"W), 1 female, 13.VI.2006, E.N.L. Rodrigues leg. (MCN 46393).

Distribution. Brazil (Rio de Janeiro, Paraná and Rio Grande do Sul).

Natural history. Collected from riparian and restinga forests of southern Brazil with a beating tray underneath bush and tree vegetational strata.

Remark. The description and illustrations MILLER (2007) and MILLIDGE (1991) render the examination of the type material of this species unnecessary.

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