

Expect the Unexpected: A New Ant from a Backyard in Utah

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Expect the unexpected: a new species of ant

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ABSTRACT—Urban centers are not where one expects to find new species. Yet, we report here a newly recognized ant, *Strumigenys ananeotes* **sp. nov.**, in an urban yard in Salt Lake City, Salt Lake County, Utah, USA. The genus *Strumigenys* is a major radiation of litter ants that are found primarily in the wet tropics and subtropics. They are extremely rare in western North America, known only from sites hundreds of kilometers south and west of Salt Lake City. The new species is related to species from southern Arizona and is presumed native. We propose that it is normally restricted to moist, subterranean microhabitats in an otherwise arid region, but that anthropogenic activity has created an urban forest with summer conditions similar to eastern deciduous forest. *Strumigenys ananeotes* may now have a greatly expanded habitat and visibility, a case of a native species benefiting from human development rather than being displaced.

RESUMEN.—Los núcleos urbanos no son lugares donde esperamos encontrar nuevas especies. En este trabajo reportamos una hormiga recientemente identificada (*Strumigenys ananeotes* **sp. nov.**) en un jardín urbano de Salt Lake County, Condado de Salt Lake, Utah, E.U. Dentro del género *Strumigenys*, se encuentran una radiación importante de hormigas que habitan principalmente, en los trópicos y subtrópicos húmedos. Estas hormigas, son muy raras en el oeste de América del Norte, siendo sólo conocidas en sitios a cientos de kilómetros al sur y al oeste de Salt Lake City. Esta nueva especie se encuentra emparentada con especies del sur de Arizona de donde es presumiblemente nativa. Proponemos que, la distribución de estas hormigas se restringe a microhábitats subterráneos húmedos, dentro de las regiones áridas. Pero la actividad antropogénica, ha creado bosques urbanos con condiciones estivales similares al bosque caducifolio oriental. Las *Strumigenys ananeotes* poseen actualmente un hábitat y una visibilidad más amplios, representando así, un caso donde una especie nativa se beneficia del desarrollo humano en lugar de ser desplazada.

New species discovery in the current era and soil that they inhabit (Brown and Wilson 1959, Bolton 2000). There are over 800 species of ants that have been poorly sampled, or the parsing of species and they are globally distributed, primarily in wet tropical and subtropical mesic forests (Bolton 2000). In North America, among insects, ants are one of the better-studied groups, and the taxonomy is in a relatively advanced state. In the United States, there is also a major radiation in mesic eastern deciduous forests, with 45 species east of where ant diversity is of the same order of the Mississippi River. In the western United States the genus is still being found but at a much lower rate than in tropical regions. As such, the last time a new ant species was found in the United States was in 1959, in a small area in Arizona and California. When a species is in the urban core of a major United States city, the colonies are deeply hidden in moist microhabitats. *Strumigenys arizonica* is a new species and suggest that we are seeing an unusual commensal interaction of native biota with the novel human-built environment. *Strumigenys arizonica* (Gray et al. 2018) and is known only from southeastern Arizona. *Strumigenys chiricahua* is known from predators feeding primarily on Collembola in a Berlese sample and a nest collected in a subterranean rotten root, also just

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from southern Arizona. *Strumigenys californica* is known from a few scattered records in Los Angeles and Monterey Counties, California, with little biological data. *Strumigenys relicquia* is known from riparian oak woodland in the Sacramento Valley, California, where a few specimens have been collected in samples of sifted litter. There are also sparse records of introduced species *S. membranifera*, *S. mixta*, and *S. silvestrii*, but these are also restricted to irrigated areas. The endemic Arizona and California *Strumigenys* species are thought to be relicts of a more mesic period in western North America (Ward 1988). Beyond the surprise of finding the first *Strumigenys* in Utah, the expectation was that this would be an introduced species: one of the globally distributed tramp species or one of the many eastern United States species. The garden bed was filled with purchased potting soil, making human introduction a likely scenario. The morphology of these specimens was carefully compared with all known *Strumigenys* species, using the global revision of Bolton (2000). Attention was paid not only to the eastern United States species, but similar species throughout the world. The Utah specimens are a previously undescribed species morphologically close to *S. arizonensis* and *S. chiricahua*, and thus are presumably native.

Salt Lake City, Utah, is in the Intermountain West, on the eastern edge of the Great Basin bioregion, in an area of strong continental climate. Winters are cold, and summers are hot and dry. Salt Lake City is hundreds of kilometers from the nearest record of *Strumigenys*, and there are certainly no previous records of the genus in Utah (e.g., Allred 1982). It is far beyond the expected range of this largely tropical and subtropical genus. Therefore, it came as a shock to discover native *Strumigenys* species in an urban backyard in Salt Lake City.

OBSERVATION

The senior author lives in a dense urban neighborhood in Salt Lake City, Salt Lake County, Utah, USA, near the University of Utah campus. It is an older neighborhood ("The Avenues") that has been developed as housing since the late 1800s. The houses are surrounded by small yards, with the typical mix of lawns and ornamental plantings. Regular summer irrigation keeps the city green. There are many street trees, and the Salt Lake Valley is now filled with a large urban forest. This forest is about 150 years old, replacing native sagebrush/grassland habitat that was largely treeless. The senior author has a small raised-bed garden, with potting soil about 20 cm deep. On the evening of 13 August 2018, after dark, he was closely examining the face of this garden, and observed 4 *Strumigenys* workers. Other foraging ants in the vicinity were *Tetramorium immigrans*, *Brachymyrmex depilis*, *Solenopsis molesta*, and *Formica*. Human-altered habitats are dominated by introduced species. In Salt Lake City, the trees are introduced, and starlings swarm restaurants. Among ants, the introduced species *Ponera pennsylvanica* is the dominant sidewalk ant. An ant species that shares the microhabitat of deep, unusual case in which massive habitat change was revealed a formerly cryptic species and 10 cm beneath where the foragers had been possibly allowed it to flourish.

DISCUSSION

Strumigenys is abundant in sites that offer warm, moist foraging environments. Native habitats in northern Utah are warm in the summer, but when it is warm the surface litter is extremely dry, even in forested riparian corridors. This new species is likely a relict, like *S. relicquia* and others, that had retreated to subterranean microsites and thus escaped detection by entomologists. But human activity has created what is effectively a temperate broadleaf deciduous forest. The summer irrigation creates many square kilometers of habitat with warm, moist leaf litter and garden soil. This species may be experiencing a Renaissance, reemerging after a long retreat belowground. In this case, the creation of an urban forest was not a disruption or displacement of its native habitat, but an expansion.



Fig. 1. A, Holotype worker *Strumigenys ananeotes*, face view, scale 0.2 mm. B, Lateral view, scale 0.5 mm. C, Dorsal view, scale 0.5 mm. D, Non-type worker (unique specimen identifier CASENT0645965), mandibular dentition, scale 0.1 mm.

Although undocumented, surely this species is not rare. If it were, it would be an odd coincidence that one of the rare occurrences happened to be in the backyard of a myrmecologist. This and other species of *Strumigenys* in western North America may be more widespread and abundant than we think, escaping detection due to their small size, cryptic habits, and previously subterranean microhabitats. We hope that this discovery will encourage naturalists to don headlamps and hand lenses and head out into the backyard on warm summer nights.

TAXONOMY

***Strumigenys ananeotes*, new species**

(Fig. 1)

TYPES—Holotype worker: USA, Utah, Salt Lake Co.: Salt Lake City, 40.77190°N 111.85419°W ± 20 m, 1410 m, 13–14 Aug 2018, urban gar-

den, nest in soil (J. Longino #10240) [California Academy of Sciences, unique specimen identifier CASENT0645955]. Paratype worker, alate queens: same data as holotype, discollected. This and other species of *Strumigenys* contributed to Harvard Museum of Comparative Zoology, United States National Museum, University of Georgia Collection of Arthropods, Monte L. Bean Life Science Museum, and Natural History Museum of Utah.

ETYMOLOGY.—Meaning “newly emerged.”

DIAGNOSIS.—*Strumigenys* can be divided into 2 morphologically distinct groups: species with long linear mostly edentate mandibles, or species with short triangular mandibles with numerous teeth along most of their length. All species having ranges centrally located in the United States belong to the latter group, formerly known as the genus *Smithistruma*. These species are very similar in morphology and size, but have distinct pilosity and tooth patterns that separate species. *Strumigenys*

ananeotes can be distinguished from all other lar teeth is the introduced species *S. margaritae*. It also has teeth that alternate in size, but alone. It is the only species in North America the smaller teeth are blunt and not pointed as having the first 7 teeth alternating betweenin *S. ananeotes*. However, in other charac- similarly sized large and small pointed teeth. ters, *S. margaritae* bears little resemblance to The basal-most tooth is small or missing, *S. ananeotes*.

which gives a count of 8 or 7 for the teeth of alternating sizes. *Strumigenys ananeotes* is most similar to the western species *S. chiricahua*, eastern species *S. hyalina*, and Mexican species *S. dispalata*. In *S. chiricahua*, the first the garden. This work was supported by 3 teeth increase in size and do not completely National Science Foundation grant DEB- overlap when the mandibles are closed, 1354739 (Project ADMAC). whereas in *S. ananeotes*, the large teeth overlap the opposing smaller teeth when the mandibles are closed. *Strumigenys hyalina* has similarly alternating large and small teeth, but the larger teeth decrease in size apically such that tooth 7 is only about half the length of tooth 1; in *S. ananeotes*, tooth 7 is only slightly smaller than tooth 1. In *S. dispalata*, teeth do not alternate in size, and tooth 2 is longer than tooth 3 and tooth 4. There are also differences in the shape of the spatulate setae the anterior margin of the clypeus. In *S. ananeotes* the setae are apically truncated and have irregular margins; in *S. hyalina*, they are also truncate but with evenly flat apical margins; in *S. chiricahua*, they are relatively narrower and evenly rounded along the anterior margins. *Strumigenys ananeotes* is also easily distinguished from other western species. In *S. arizonica*, the first and fourth mandibular teeth are subequal in length and shorter than the second, third, and fifth teeth. In *S. californica*, the first 6 teeth gradually and slightly decrease in size. *Strumigenys reliquia* has simple-to-subflagellate hairs on the clypeus. The only other species with similar mandibu-

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