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First record of *Centris* (*Paracentris*) *lanosa* (Apidae: Centridini) in Georgia, United States

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Abstract. *Centris* (*Paracentris*) *lanosa* Cresson, the woolly oil-digger bee, is a specialized oil-collecting species associated with *Krameria lanceolata* (Torrey) (Krameriaceae). The species is known from two disjunct populations in the southeastern and southwestern United States, with southeastern records previously limited to northern Florida. Here, we report the first occurrence of *C. lanosa* in Georgia. On 13 May 2024, we collected a female specimen of *C. lanosa* in a blue vane trap located in a mixed pine-hardwood riparian buffer within privately owned timberland in Treutlen County, Georgia. This new record extends the known range of the species northward by more than 250 km.

INTRODUCTION

Centris (*Paracentris*) *lanosa* Cresson, commonly known as the woolly oil-digger bee, is a highly specialized oil-collecting species that relies on its host plant *Krameria lanceolata* (Torrey) (Krameriaceae) to complete its lifecycle (Pemberton & Liu, 2008). Bees in the genus *Centris* Fabricius are typically robust and fast-flying, with most species possessing specialized oil-collecting structures and all lacking arolia between their tarsal claws (Simpson & Neff, 1981; Michener, 2007). *Centris lanosa* is a medium-sized species (~9.7–11.8 mm in body length) with densely pubescent hind tibia and basitarsi (Michener, 2007; Pemberton & Liu, 2008). It can be differentiated from similar co-occurring species, including *C. errans* Fox and *C. nitida* Smith by the all-black clypeus in females and the all-yellow clypeus in males (Fig. 1; Pemberton & Liu, 2008).

Records of *C. lanosa* are widespread in the southern USA west of the Mississippi River (e.g., Arizona, New Mexico, and Texas) and a small, disjunct population has been found in Florida (Snelling 1984; Pemberton & Liu, 2008), but no previous survey records exist for other eastern states (Ascher & Pickering, 2025). Mitchell (1962) suggested that it may be necessary to split these disjunct populations into two

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subspecies. Further surveys and molecular analyses are needed to determine the level of separation between these southeastern and southwestern populations. Previously, it was reported that southeastern *C. lanosa* populations were restricted to northern Florida, with specimens recorded from Alachua, Clay, and Gilchrist counties (Florida State Collection of Arthropods, Gainesville; Snelling, 1984; Pemberton & Liu, 2008) and one male specimen collected near the Florida and Georgia border in Leon County (Gruenewald, 2014; USGS EESC 2019). Here, we report the first record of *C. lanosa* in Georgia and discuss its ecology and distribution.



Figure 1. Female (top) and male (bottom) *Centris lanosa* Cresson in lateral and frontal views. The female specimen was collected in Treutlen County, Georgia, and the male specimen in Leon County, Florida. Image credits: E.L. Briggs and Brooke Alexander (USGS EESC Bee Lab).

MATERIAL AND METHODS

On 13 May 2024, we collected a female specimen of *C. lanosa* in a blue vane trap (SpringStar, Inc., Woodville, Washington) in Treutlen County, Georgia, within the Southeastern Plains ecoregion. The blue vane trap was in the understory of a streamside management zone (SMZ) within a privately owned and managed *Pinus taeda* (L.) (Pinaceae) stand. These mixed pine-hardwood riparian buffers surround perennial and intermittent streams and are a commonly implemented state-approved

forestry best management practice to reduce nonpoint source pollution and protect water quality during forestry operations (Schilling *et al.*, 2021).

The specimen was collected as part of a larger study on pollinator biodiversity in SMZs in private, working pine forests. Despite the approximately 20 million hectares of planted timberland within the southern United States, there has been limited research on lower trophic level biodiversity in SMZs, including insect pollinators and their host plant species (Oswalt *et al.* 2019; Larsen-Gray & Loehle, 2022). After trap collection, we washed, dried, and pinned the specimen, and then transported it to Sam Droege (U.S. Geologic Survey Eastern Ecological Science Center) for identification. Sam Droege confirmed the specimen as *C. lanosa* through the black coloration of its clypeus (Ascher & Pickering, 2025).

The specimen was deposited in the USGS Bee Inventory and Monitoring Lab (BIML) collection in Laurel, Maryland, USA. We did not identify any additional specimens within the Georgia Museum of Natural History Insect Collection. To better visualize *C. lanosa* and *K. lanceolata* distributions, we generated a map (Fig. 2) of public georeferenced records for both species from the Global Biodiversity Information Facility (GBIF) (GBIF, 2025a,b).

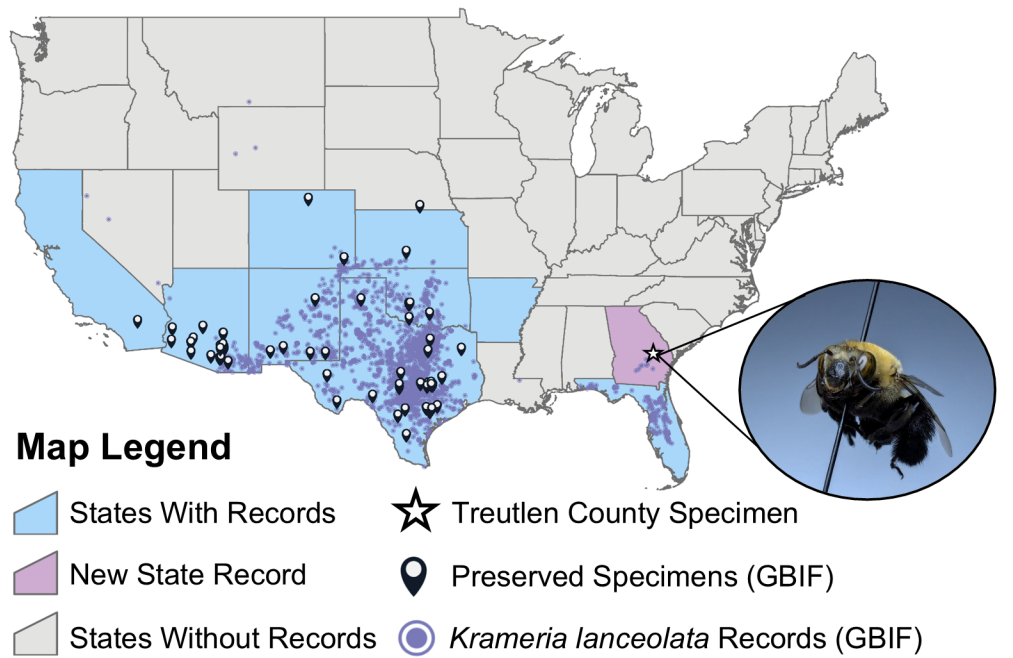


Figure 2. Distribution of *Centris lanosa* Cresson and its host plant *Krameria lanceolata* (Torrey) (Krameriaceae) in the US based on Global Biodiversity Information Facility (GBIF) records, along with the location of the specimen collected in Treutlen County, Georgia.

RESULTS AND DISCUSSION

Our specimen is the first record of *C. lanosa* in the state of Georgia and extends the known range of the species northward by more than 250 km (Ascher & Pickering, 2025). Our findings indicate that the range of this species extends into the Upper Coastal Plain of Georgia, where its host plant has been observed in Bulloch, Bryan, Emanuel, and Evans counties (Weakley, 2022). *Krameria lanceolata*, the only member of Krameriaceae known to occur in the southeastern USA, is a low-growing herbaceous perennial

that produces five-petaled red flowers and armored sandbur-like fruits (Musselman, 1975; Weakley, 2022). This species is an obligate semi-parasite, with plants forming an extensive network of haustorial roots from which they extract nutrients from a wide variety of host plants, including *Pinus palustris* (Mill.) (Pinaceae), *Diospyros virginiana* (L.) (Ebenaceae), *Quercus laevis* (Walter) (Fagaceae), and various grasses and forbs (Musselman, 1975).

Southeastern *K. lanceolata* populations are thought to be restricted to “deep sand ridges of the coastal rivers of Georgia” and “sandy flatwoods in northern and central Florida” (Musselman & Mann, 1978). Both *C. lanosa* and *K. lanceolata* appear to be absent from southern Florida. As a highly specialized bee, the distribution and flight season of *C. lanosa* are likely closely tied with the flowering period of *K. lanceolata*, which typically occurs during May–July in southeastern populations (Weakley, 2022).

Krameria spp. flowers attract *Centris* spp. bees with glandular oil-filled elaiophores located within their thin-walled epidermal tissues (Balbuena *et al.*, 2024). Female oil-collecting bees use specialized setal combs on their forelegs (elaiospates) to rupture the elaiophores, harvest floral oils, and then transfer the liquid to their bristly hind leg scopula for transport to the nest (Simpson & Neff, 1981; Michener, 2007; Balbuena *et al.*, 2024).

Members of the subgenus *Paracentris* Cameron (of which *C. lanosa* belongs) typically construct vertical brood cells in bare soil (Michener, 2007; Pemberton & Liu, 2008). Female bees mix *Krameria* spp. floral oils with pollen and nectar from other floral hosts to form larval brood cell provisions (Balbuena *et al.*, 2024). Females may also use floral oils in nest construction, with some *Centris* spp. lining their brood cells with hardened waxy secretions derived from floral lipids (Neff & Simpson, 2017; Balbuena *et al.*, 2024). In addition to structural support, these cell linings likely provide some degree of waterproofing for their underground nests (Michener, 2007; Neff & Simpson, 2017).

Our findings underscore the importance of ongoing biodiversity studies in understudied areas and suggest that SMZs can provide valuable resources for flower-visiting insects within managed forest landscapes. Additional research is needed to explore bee diversity within SMZs and to fully assess the geographic extent of southeastern *C. lanosa* populations. These targeted survey efforts will help conserve rare and rarely encountered bees, such as *C. lanosa*, with disjunct distributions and highly specialized plant-pollinator relationships.

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