Methods

Observations were made at 50x or 63x magnification with a dissecting microscope. Most measurements were made with a micrometer stage with digital output in increments of 0.0001mm. However, variation in specimen orientation, alignment of crosshairs with edges of structures, and interpretation of structure boundaries resulted in measurement accuracy to the nearest 0.01 to 0.005mm, depending on sharpness of the defined boundary. All measurements are presented in mm.

Material from the following collections was examined for this study:

INBC: Instituto Nacional de Biodiversidad, Costa Rica.
JTLC: John T. Longino, personal collection, Olympia, WA, USA.
LACM: Los Angeles County Museum of Natural History, Los Angeles, CA, USA.
MCSN: Museo Civico de Storia Naturale "Giacomo Doria," Genoa, Italy.
MCZC: Museum of Comparative Zoology, Cambridge, MA, USA.
MHNG: Muséum d'Histoire Naturelle, Geneva, Switzerland.
NMW: Naturhistorisches Museum, Vienna, Austria.
USNM: National Museum of Natural History, Washington, DC, USA.

Results

The group of species under discussion share the following morphological traits:

Minor worker: head width (not including eyes) 0.38 to 0.55mm; scape length 0.40 to 0.60mm; scape index (100 * scape length / head width) 95 to 125; face and mesosoma uniformly foveolate; promesonotal groove very weakly or not at all impressed; with short upturned propodeal spines; postpetiole broad and low, somewhat flattened, lower than petiolar node; first gastral tergite with anterior third to entire surface shagreened; pilosity on mesosomal dorsum sparse and stiff; pilosity on hind tibia fully appressed and short.

Major worker: head width 0.74 to 1.09mm; scape length 0.44 to 0.63mm; scape index 50 to 68; face largely foveolate rugose, with variable extent smooth and shiny posteriorly; hypostomal margin with two closely-spaced medial teeth; first gastral tergite with anterior third to entire surface shagreened.

We recognize in Costa Rica two distinct species, *P. anastasii* and *P. bilimeki*, that can be separated on the basis of relative scape length in the minor worker, color, habitat preference, and nesting habits. Minor workers of *Pheidole anastasii* have relatively longer scapes (Fig. 1) and the posterior margin of the head is more rounded, both majors and minors are uniformly yellow orange, nests are in plant cavities, and the species inhabits the shaded understory of mature or second growth wet forest. Minor workers of *P. bilimeki* have shorter scapes (Fig. 1) and the head is less rounded behind, both majors and minors are brown, nests are almost anywhere including in rotten wood and under stones, and the species inhabits mostly open and highly disturbed areas. The two species are sympatric throughout Costa Rica, but typically maintain a strict habitat separation. At La Selva Biological Station, in lowland rainforest on the Atlantic slope, *P. anastasii* is one of the most abundant ants in the forest understory, and is never found in the laboratory clearing. In contrast, *P. bilimeki* is abundant in the laboratory clearing, where it can be a pest ant in buildings, yet is never found in the forest. At Sirena in Corcovado National Park in southeastern Costa Rica, *P. anastasii* is a common understory ant in mature and second growth forest, much like it is at La Selva, while *P. bilimeki* is common in the vegetation of the upper beach margin and extending less than 20m into the forest.

Pheidole anastasii has a relatively consistent morphology and behavior over most of its range. Most collections are from Costa Rica (over 350 separate collection events in JTL's specimen database) but a few collections have been examined from Panama, Nicaragua, Honduras, Guatemala, and Mexico (Chiapas). All collections are from wet forest habitats, most from below 500m elevation but with a few to a maximum of 1200m. The northernmost record is from rainforest near Tikal in the Peten of Guatemala, and these specimens