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The Species and Subspecies of *Nomamyrmex* (Dorylinae: Formicidae)

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ABSTRACT

The species and subspecies of *Nomamyrmex* Borgmeier, 1936, are considered. Included is a list of recognized species and subspecies, distinguishing characteristics, keys and figures (1–28), distribution maps with a discussion of the ranges of the subspecies, and a bibliography.

Nomamyrmex Borgmeier, 1936, clearly consists of two distinct species, *N. hartigi* (Westwood, 1842) and *N. esenbecki* (Westwood, 1842); however, there has been much confusion concerning the subspecies of *N. esenbecki*. No less than fourteen different names have been assigned to forms of *N. esenbecki*. Borgmeier (1955) did an excellent job of combining these forms into three subspecies, *N. esenbecki s. str.* (Westwood, 1842), *N. esenbecki crassicornis* (F. Smith, 1855) and *N. esenbecki wilsoni* (Santschi, 1920); however, I believe the information presently available warrants the separation of *Eciton* (*Holopone*) *crassicorne mordax* Santschi, 1928, from *N. esenbecki wilsoni*. This previous synonymy is understandable as Borgmeier had only three workers (no males) of *mordax* available to him. He examined one small worker ("Type") and two workers ("vielleicht Nidotypen") from Cuernavaca, Morelos, Mexico (Borgmeier, 1955:147). If males of *mordax* had been available to Borgmeier, I doubt that he would have made the above synonymy, as the males are much more distinct. Also, Cuernavaca is near the margin of the presently proposed range of *mordax*. I have examined 17 workers (four series) from Cuernavaca including the two "nidotypen," one male taken a few kilometers north and six males taken about 50 kilometers south of Cuernavaca, all of which will key to *N. esenbecki mordax* in my keys. These workers and males are the same forms as those I have examined from the states of Oaxaca (N.W. corner), Guerrero (N.), Michoacan, Colima, Jalisco, Nayarit, Sinaloa, Durango and Sonora in Mexico. I have examined numerous workers and males from the above localities and all of these specimens can be distinguished from those (i.e., *N. esenbecki wilsoni*) collected from the remainder of Mexico.

I first recognized that the *Nomamyrmex esenbecki* specimens from western Mexico were different from *N. esenbecki wilsoni* while examining specimens for preparation of "The Identification and Distribution of New World Army Ants" (Watkins, 1976). However, I did not

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realize at that time that they were the same as the workers described as *Eciton (Holopone) crassicorne mordax* by Santschi (1928). Therefore, these forms were referred to as *Nomamyrmex esenbecki*, n. subsp. in the above publication (pp. 5, 29, 50, 53, 88, 98, 99). It was not my intention to restudy the subspecies of army ants at that time.

RECOGNIZED SPECIES AND SUBSPECIES

Nomamyrmex Borgmeier, 1936

N. hartigi (Westwood, 1842)
N. esenbecki (Westwood, 1842)
N. esenbecki s. str. (Westwood, 1842)
N. esenbecki crassicornis (F. Smith, 1855)
N. esenbecki wilsoni (Santschi, 1920)
N. esenbecki mordax (Santschi, 1928)

DISTINGUISHING CHARACTERISTICS AND VARIATIONS

Nomamyrmex. Workers: postpetiole distinct from gaster; antennal insertions not covered by frontal carinae; each eye composed of a single ocellus-like unit; each tarsal claw with a small inner tooth; scape thick (apical width greater than one-third its length). Males: length 15–23 mm; gaster cylindrical with conspicuous tufts of long dense setae (Fig. 6–11).

N. hartigi. Workers: postoccipital sulcus absent (Fig. 1); dorsum of petiole without longitudinal rugae. Males: border of head behind ocellar peduncle without a lamella; first gastric tergite without longitudinal rugae; width of blade of stipes at least two-thirds its length (Fig. 12); posteroventral projection of volsella triangular with a small dorsal tooth near sharp apex (Fig. 17, 18). The characteristics of *N. hartigi* are very uniform throughout its entire range.

N. esenbecki. Workers: postoccipital sulcus distinct (Fig. 2–5); dorsum of petiole with longitudinal rugae. Males: median border of head behind ocellar peduncle with a narrow lamella; first gastric tergite usually with longitudinal rugae; width of blade of stipes about one-half its length (Fig. 13–16); volsella blunt, gradually tapered or snout-shaped (Fig. 19–28).

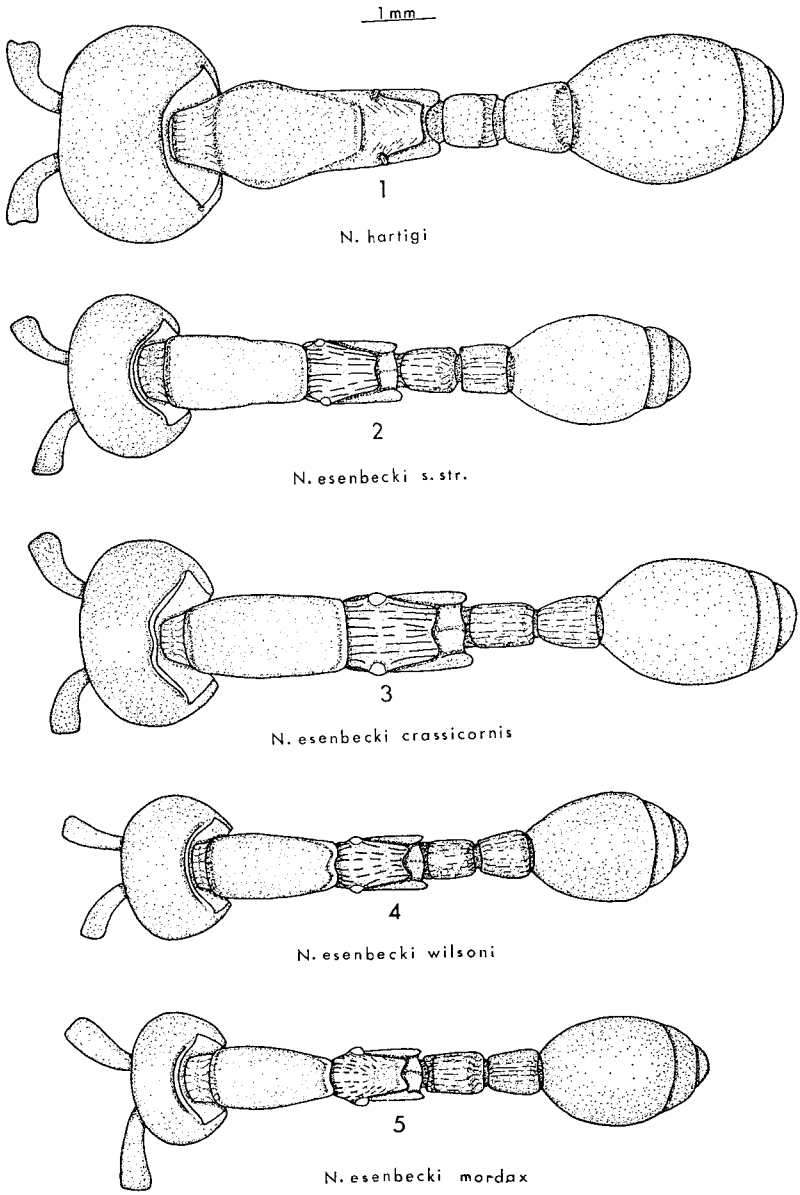
N. esenbecki s. str. Workers: transversely keeled posterior margin of mesonotum usually straight or slightly convex in the middle (Fig. 2); anterior corners of postpetiole prominent and abruptly rounded causing the postpetiole to appear subquadrate with an anterior face as broad or broader than the petiole (Fig. 2); entire body usually dark reddish brown with gaster sometimes slightly lighter. The mesonotal keel is occasionally slightly concave, but usually not in all specimens in a series. The posterior edge of the propodeum is often only slightly indented between the propodeal "teeth", but a few specimens may be deeply indented (dorsal view). Males: setae on fifth gastric tergite broadly separated along the midline (i.e., the separation is about one-

half the width of the tergite near its base (Fig. 7); distal portion of volsella distinctly snout-shaped, but the "snout" varies somewhat in detail (Fig. 19, 20).

N. esenbecki crassicornis. Workers: transversely keeled posterior margin of mesonotum usually straight or slightly convex in the middle (Fig. 3); anterior corners of the postpetiole not prominent with the sides gradually curving inward to the anterior face which is slightly narrower than the petiole causing the postpetiole to appear trapezoidal (Fig. 3); gaster usually yellowish brown, remainder of body reddish brown. A few workers from Panama have slightly concave mesonotal keels; however, these workers have postpetioles and yellowish brown gasters typical for *crassicornis*. Males: setae on fifth gastric tergite not distinctly separated along the midline (Fig. 8, 9); longitudinal rugae distinct on the second gastric tergite; apex of volsella slightly enlarged and rounded (Fig. 21–23). The entire posterior half of the fifth tergite is usually covered with long thick setae; however, some specimens from Panama have the setae along the midline more confined to the posterior border and these setae are shorter than the more lateral setae. The distal portion of the volsella is slightly upturned with a gradually rounded apex in specimens from Panama (Fig. 21), almost straight with a bluntly rounded apex in specimens from Trinidad (Fig. 22), and somewhat more downturned in specimens from Peru (Fig. 23).

N. esenbecki wilsoni. Workers: transversely keeled posterior margin of mesonotum slightly to moderately concave in the middle (Fig. 4); entire dorsum of propodeum with prominent longitudinal rugae, several of which extend to its posterior edge (Fig. 4); postpetiole more subquadrate than *crassicornis* and sometimes only slightly less subquadrate that *esenbecki s. str.*; gaster more nearly the color of the alitrunk than workers of *crassicornis*. Males: setae on fifth gastric tergite distinctly separated along the midline (Fig. 10); longitudinal rugae indistinct or absent on second gastric tergite, except sometimes in sulcus at anterior edge; distal one-half of volsella (lateral view) straight with a blunt, somewhat truncated apex (Fig. 24, 25).

N. esenbecki mordax. Workers: transversely keeled posterior margin of mesonotum slightly to moderately concave in middle (Fig. 5); prominent longitudinal rugae confined to anterior one-half to two-thirds of propodeum and do not usually extend to its posterior edge—there is a distinct granulated area in the posteromedial portion of the dorsum of the propodeum without longitudinal rugae (dorsal view, Fig. 5). Males: setae on fifth gastric tergite distinctly but narrowly separated along the midline (i.e., the separation is about one-fourth the width of the tergite near its base, Fig. 11); longitudinal rugae indistinct or absent on second gastric tergite except sometimes in sulcus at anterior edge; distal one-fourth of volsella gradually tapered and slightly bent downward (lateral view, Fig. 26, 27); however, the volsella is occasionally more snout-shaped (Fig. 28) as in *esenbecki s. str.*



FIGS. 1–5. Dorsal views of major workers of *Nomamyrmex.*

KEYS TO SPECIES AND SUBSPECIES OF *NOMAMYRMEX*

Workers

Caution: A few workers of *N. esenbecki s. str.* and *N. esenbecki crassicornis* may have slightly concave mesonotal keels —usually not all workers in a series. These variants make couplet 2 of this key difficult; however, these workers can be distinguished on the basis of the geographical range given in couplet 2. The shape of the postpetiole of *esenbecki s. str.* (c.f., couplet 4.a.), and the coloration of *crassicornis* (c.f., couplet 4.b.) will also help distinguish these variants.

1.a. Postoccipital sulcus absent (Fig. 1); dorsum of petiole without longitudinal rugae ..... *hartigi*

b. Postoccipital sulcus present (Fig. 2–5); dorsum of petiole with longitudinal rugae (*esenbecki*) 2

2.a. Transversely keeled posterior margin of mesonotum slightly to moderately concave in middle (dorsal view, Fig. 4, 5); Costa Rica north to Austin, Texas 3

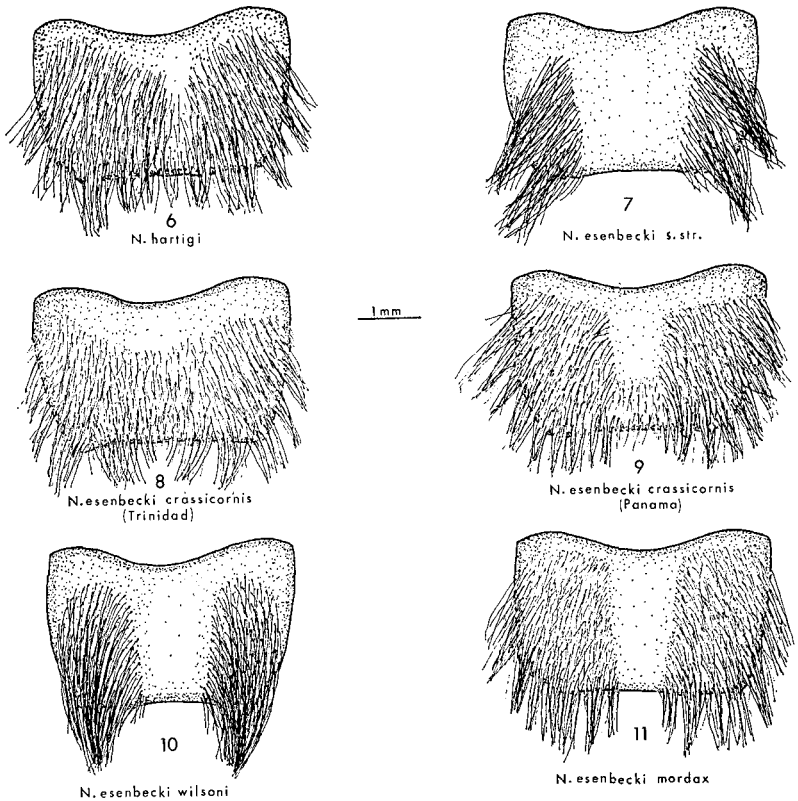
b. Transversely keeled posterior margin of mesonotum usually straight or slightly convex in middle (dorsal view, Fig. 2, 3); Costa Rica south to Argentina 4

3.a. Entire dorsum of propodeum with prominent longitudinal rugae, several of which extend almost to the posterior edge (dorsal view, Fig. 4); south Texas, northeast and south Mexico south to Costa Rica ..... *esenbecki wilsoni*

b. Prominent longitudinal rugae confined to anterior half or two-thirds of dorsum of propodeum and usually do not extend to its posterior edge (dorsal view, Fig. 5); Mexico; west of Sierra Madre Occidental and extending southeastward along the Balsas River Valley ..... *esenbecki mordax*

4.a. Anterior corners of postpetiole prominent and abruptly rounded causing the postpetiole to appear subquadrate with an anterior face as broad or broader than the petiole (dorsal view, Fig. 2); entire body dark reddish brown with gaster only slightly lighter; Brazil, eastern Bolivia, Paraguay, northern Argentina ..... *esenbecki s. str.*

b. Anterior corners of postpetiole not prominent with the sides gradually curving inward to the anterior face which is slightly narrower than the petiole causing the postpetiole to appear trapezoidal (dorsal view, Fig. 3); gaster yellowish brown, remainder of body reddish brown (best observed at 10× with high illumination); Costa Rica (southern one-third), Panama, Colombia, Venezuela, Trinidad, Peru, western Brazil, western Bolivia ..... *esenbecki crassicornis*



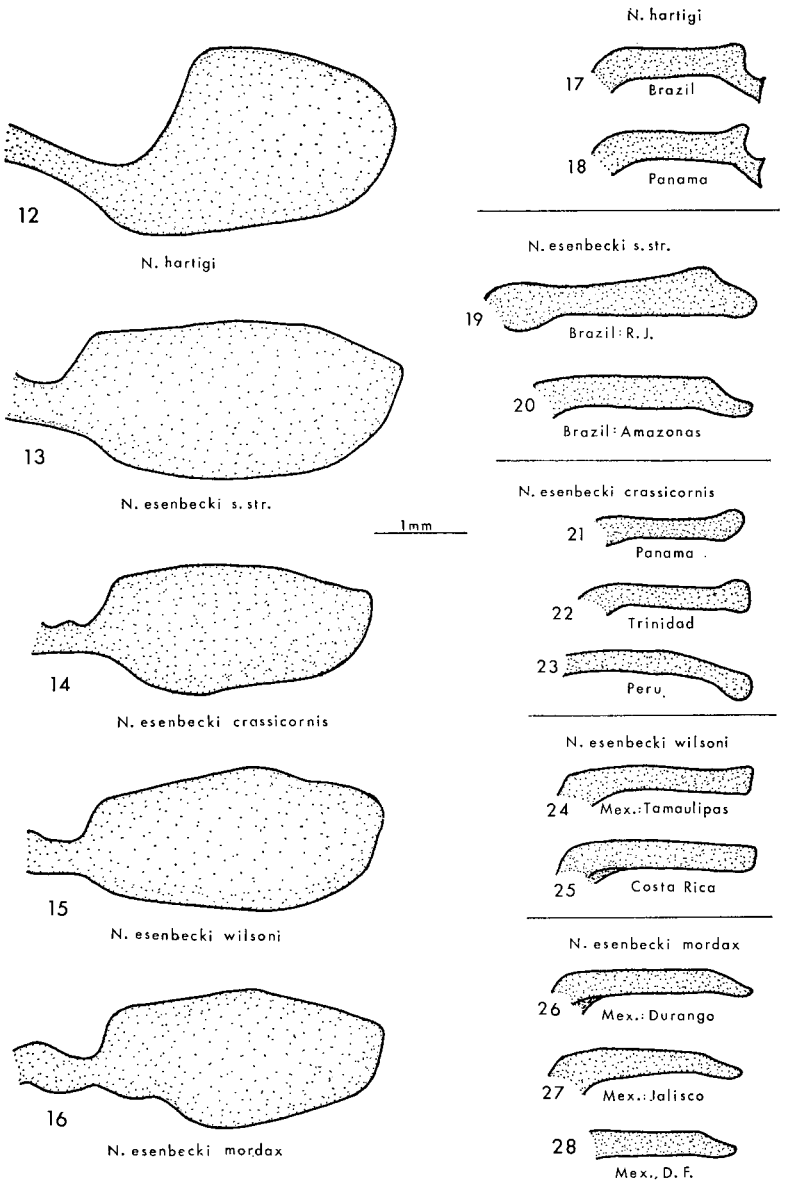
FIGS. 6–11. Dorsal views of fifth tergites of males of *Nomamyrmex*.

Males

1.a. Border of head behind ocellar peduncle without lamella; first gastric tergite without longitudinal rugae; width of blade of stipes at least two-thirds its length (Fig. 12); posteroventral projection of volsella triangular with a small dorsal tooth near the sharp apex (Fig. 17, 18) ..... ***hartigi***

b. Median border of head behind ocellar peduncle with a narrow lamella; first gastric tergite usually with longitudinal rugae; width of blade of stipes about one-half its length (Fig. 13–16); volsellae blunt, gradually tapered or snout-shaped (*esenbecki*, Fig. 19–28) 2

2.a. Setae on fifth gastric tergite not distinctly separated along midline (i.e., erect setae are at least present in the middle of the



FIGS. 12–16. Lateral views of stipites of males of *Nomamyrmex*.
FIGS. 17–28. Lateral views of volsellae of males of *Nomamyrmex*.

posterior portion of the tergite, even though these setae may be somewhat shorter than the lateral setae (Fig. 8, 9); longitudinal rugae distinct on second gastric tergite ..... *esenbecki crassicornis*

b. Setae on fifth gastric tergite distinctly separated along the midline (Fig. 7, 10, 11); longitudinal rugae indistinct or absent on second gastric tergite except in sulcus at anterior edge 3

3.a. Distal one-half of volsella (lateral view) straight with a blunt apex (Fig. 24, 25) ..... *esenbecki wilsoni*

b. Distal portion of volsella (lateral view) snout-shaped or tapered and slightly bent downward (Fig. 19, 20, 26–28) 4

4.a. Setae on fifth gastric tergite broadly separated along midline (i.e., separation about one-half width of tergite near its base, Fig. 7); distal portion of volsella distinctly snout-shaped (Fig. 19, 20) ..... *esenbecki s. str.*

b. Setae on fifth gastric tergite narrowly separated along midline (i.e., separation about one-fourth width of tergite near its base, Fig. 11); distal one-fourth of volsella slightly tapered and slightly bent downward (Fig. 26–28) ..... *esenbecki mordax*

DISTRIBUTION OF THE SPECIES AND SUBSPECIES OF *NOMAMYRMEX* (Maps 1, 2)

Nomamyrmex hartigi ranges from Mexico City to southern Brazil but has not been collected from Bolivia or Argentina. This species has been collected from fewer localities than has *N. esenbecki s. lat.* and has only rarely been taken from western South America. The species seems to be rare in central Mexico but is relatively common in the state of Chiapas.

Nomamyrmex esenbecki mordax is confined to western Mexico and the Balsas River valley. Its range is bounded on the east by the Sierra Madre Occidental and on the south by the Sierra Madre del Sur. Its range extends eastward along the Balsas River valley from the west coast to the upper tributaries of the Balsas system southeast of Mexico City to a longitude of about 98°. This range includes Cuernavaca—the type locality for *Eciton* (*Holopone*) *crassicornis mordax* Santschi, 1928.

Nomamyrmex esenbecki wilsoni ranges from Austin, Texas (near 30° North latitude) southward through the northern two-thirds of Costa Rica. In northeastern Mexico its range is bordered on the west by the Sierra Madre Oriental.

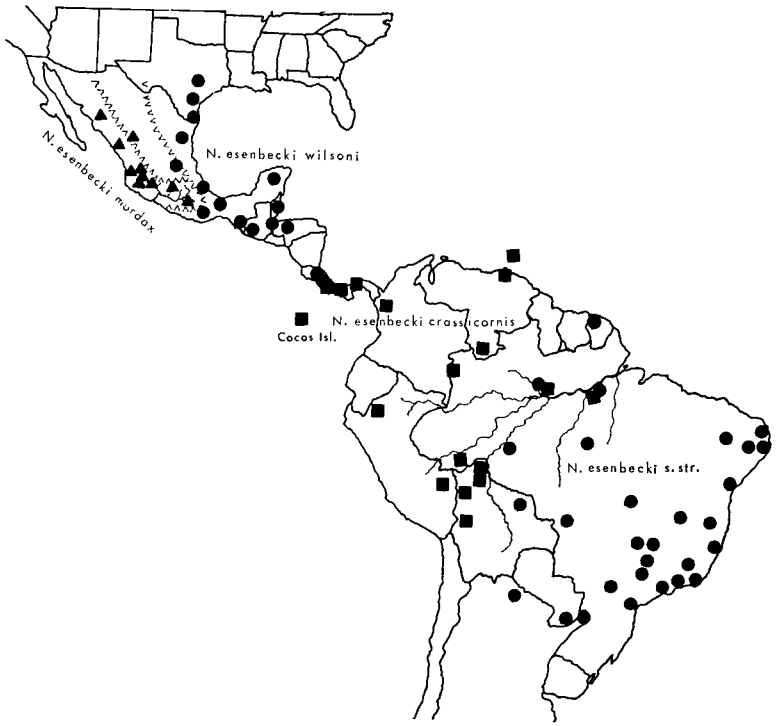
Nomamyrmex esenbecki crassicornis ranges from the southern one-third of Costa Rica southeastward to the Amazon-Madeira-Mamore river system in Brazil and Bolivia. This species is not known to occur south of 20° south latitude.

Nomamyrmex esenbecki s. str. is mostly confined to Brazil, western Bolivia, Paraguay and northern Argentina. Its northwestern limits seem to be approximately the Amazon-Madeira-Mamore river system;

MAP 1. Distribution of *Nomamyrmex hartigi*.

however, Borgmeier (1955) reported a male from French Guiana; therefore, the range may extend north of the eastern Amazon to this locality. The known range extends to about 28° south latitude.

The ranges of *N. esenbecki s. str.* and *N. esenbecki crassicornis* overlap along the Amazon River. Males of both subspecies were collected by Zerny at Taperinha (near Santarem, Para, Brazil). Workers of *crassicornis* were collected by Zikan at Manaus (Amazonas, Brazil) and a male of *esenbecki s. str.* was taken by Rabaut on the Rio Negro 14 kilometers from Manaus. Borgmeier (1955:147) discussed this situation and postulated that isolation of the two forms may be maintained by their having different breeding seasons. The males collected at Taperinha were collected on July 21–31 (*crassicornis*) and on September 1–7 (*s. str.*). The male of *esenbecki s. str.* taken near Manaus was collected in October. Sufficient data on male emergence dates is still not presently available to clarify this situation; however,



MAP 2. Distribution of *Nomamyrmex esenbecki*.

collection data from other non-adjacent localities cast doubt on this hypothesis.

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