= Novomessor ensifer =

Novomessor ensifer is a species of ant endemic to Mexico . A member of the genus Novomessor in the subfamily Myrmicinae , it was first described by Swiss entomologist Auguste Forel in 1899 . N. ensifer was originally a part of the genus Aphaenogaster until a recent phylogenetic study concluded that Novomessor was genetically distinct and should be separated . The ant is a medium @-@ sized species , measuring 5 @.@ 5 to 10 millimetres (0 @.@ 2 to 0 @.@ 4 in) . The ant is ferruginous @-@ colored in some certain parts of the body , and small workers (nanitics) in incipient colonies are noticeably different in color and body structure .

N. ensifer is active throughout the day , where they forage on the ground and sometimes on low herbs . Colonies are found under stones and other objects in tropical dry forests and pine @-@ oak forests . These ants are solitary foragers and predominately feed on insects such as wasps and months . The only known predator of N. ensifer is the giant horned lizard (Phrynosoma asio) . While nothing is known about its reproduction , nuptial flight may take place during spring or summer , where queens establish their nests under stones and other objects .

= = Taxonomy = =

Novomessor ensifer was originally described as Aphaenogaster ensifera in 1899 by Swiss entomologist Auguste Forel , who provided the first dscription of N. ensifer in his third volume of Biologia Centrali @-@ Americana . Among the genus Aphaenogaster , Italian entomologist Carlo Emery placed N. ensifer in the subgenus Deromyrma in 1915 , although this is now a synonym . In 1934 , the taxon Novomessor manni was described as a new species of Novomessor based on workers collected by William M. Mann at Colima , Mexico . However , a study showed that N. manni was a synonym of N. ensifer . Brown comments that N. manni was described as a new species because of the supposed distinct features between two type specimens of N. ensifer , but Brown noticed no morphological differences . The exact type locality for N. manni is unknown , but entomologist Paul Kannowski speculates that the ant is restricted to arid scrub forests around the Pacific Slope in Mexico . This speculation is consistent with the preferred habitat of N. ensifer .

Novomessor was synonymized in 1974 , although evidence to retain it as a valid genus emerged when scientists discovered an exocrine gastral glandular system in two Novomessor species and none in Aphaenogaster . However , N. ensifer does not have this glandular system . English myrmecologist Barry Bolton argues that basing the genus on such feature cannot justify the separation of Novomessor and Aphaenogaster . In 2015 , a phylogenetic study concluded that Novomessor was genetically distinct from Aphaenogaster , and the genus was revived from synonymy to include N. ensifer , N. albisetosus and N. cockerelli as members of it .

= = Description = =

N. ensifer is a medium @-@ sized species , measuring 5 @.@ 5 to 10 millimetres (0 @.@ 2 to 0 @.@ 4 in) . Excluding the mandibles , the head is 1 @.@ 93 ? 2 @.@ 53 millimetres (0 @.@ 076 ? 0 @.@ 100 in) long and 1 @.@ 25 ? 1 @.@ 69 millimetres (0 @.@ 049 ? 0 @.@ 067 in) wide . The scapes of the antennae surpass the occipital margin , and the second segment of the funiculus is longer than the first . The third and fourth segments are the same length as each other , although they are longer than the second . Between the fifth and second last segments , they are much shorter except for the last one . The head is twice as long than broad , and it is widest behind the eyes . The larvae measure 8 millimetres (0 @.@ 3 in) in length and appear similar to that of N. albisetosus . The larvae can be distinguished by the abundance of hair with long stouts found on the body . The apical teeth of the mandibles are long and straight , whereas the medial teeth are much smaller .

The posterior to the eyes are convex , where it converges towards the occiput (the back of the head) and forms a collar seen in several Aphaenogaster species . The ants have large , triangular mandibles with three apical teeth and a flat clypeus . The eyes are large with 400 facets , but

workers from small incipient colonies only have 200 facets . Workers from incipient also differ from workers living in mature colonies , notably in size , body shape and coloration . The average length is 5 @.@ 56 ? 6 @.@ 5 millimetres (0 @.@ 219 ? 0 @.@ 256 in) ; the head is 1 @.@ 52 ? 1 @.@ 69 millimetres (0 @.@ 060 ? 0 @.@ 067 in) long and 0 @.@ 98 ? 1 @.@ 12 millimetres (0 @.@ 039 ? 0 @.@ 044 in) wide . The epinotal spines (spines found on the first abdominal segment that protect the pedicel) are much shorter . Hair is also less noticeable on the workers .

The ant has pubescence (soft short hair) abundant throughout some certain parts of the body , including the funiculi and tarsi . It is more sparse on the coxae , genae (an area on both sides of the head below the eyes) , gaster and gula (the reduced sternite of the first segment of the thorax) . Hairs on the scapes point downwards . Erect and suberect hair are seen all over the body in sparse numbers , although this varies . These hairs are not as abundant in comparison to other Novomessor species . The head and thorax are both ferruginous @-@ colored , and the epinotal spines , legs and node are yellowish red . The antennal scapes are reddish brown and the abdomen is piceous brown . The hair exhibits a gold @-@ like color . The suture is absent from the thorax , and the mesonotum is wider than the epinotum . The front portion of the mesonotum is narrow whereas the back is rectangular . The node is evenly round and oval shaped , the postpetiole is narrow at the front and the dorsum is feebly convex . The gaster is large and oval shaped .

= = Distribution and habitat = =

N. ensifer is endemic to Mexico and can be found in tropical dry forests at altitudes of between 115 and 1 @,@ 700 ft (35 and 518 m) above sea level . In some cases , colonies have been found 5 @,@ 000 ft (1 @,@ 500 m) below the Pacific Slope . The ant is found throughout several Mexican states within the east , including Guerrero and Michoacán from the south , and Colima and Jalisco from the north . Nests are commonly found in basins and mountains along the Pacific Slope in pine @-@ oak forests . Scrub @-@ thorn forests are also abundant , consisting of trees and shrubs that are 15 and 25 ft (4 @.@ 6 and 7 @.@ 6 m) tall , but other areas may contain low herbs and grasses . Plants and trees such as thorn trees (Acacia) , poinciana plants (Caesalpinia pulcherrima) and Casearia corymbosa have been identified in these habitats . Other identified plants and trees include Indian mallows (Abutilon) , spurred anodas (Anoda cristata) , Cathestecum erectum , dayflowers (Commelina) , cigar plants (Cuphea) , hairy crabgrass (Digitaria sanguinalis) , crane grass (Ixophorus unisetus) , Mimosa , Mexican panicgrass (Panicum hirticaule) , Senna uniflora and Setaria liebmannii . These habitats usually have a wet season in summer and autumn and a dry season in spring .

N. ensifer is a xerophilous species that can thrive in dry climates . In Colima , colonies are frequent among the basins , but rarely are they found in the mountainous regions . N. ensifer ants prefer to nest in the sand and under large stones , as certain areas in Manzanillo had no stones buried in the soil and no colonies were found alongside hills with plain soil . Most colonies are found under stones with no noticeable craters surrounding the nest entrance , although one colony was found under an Acacia plant . These nest holes are usually 1 in (2 @.@ 5 cm) in diameter . A single path connects the entrance to the main nest site , followed by a passage that descends straight into the dirt several inches deep . This passage widens under a stone which forms a gallery for the larvae and pupae . Wherever stones are formed , passageways may descend further into the ground and form more chambers . Although it is unknown how deep these passages go , excavated nests are as deep as 15 in (38 cm) .

= = Behavior and ecology = =

Unlike other Novomessor species , workers forage early in the morning and late afternoon , whereas N. cockerelli and N. albisetosus forage during the afternoon and evening . However , it is unknown whether or not these ants are active during the night . Foragers first emerge from their nests at 9 A.M. and return by 5 P.M. They are rarely seen during the middle of the day when temperatures reach 95 ? 100 ° F (35 ? 38 ° C) , although the ground temperature is considerably

higher . Workers are commonly seen foraging between 9 and 11 A.M. and 3 to 5 P.M. Most workers forage on the ground , but sometimes they can be seen walking on low herbage without feeding on the plants or collecting any seeds . Excavated nests showed no evidence that these ants collect seeds , and no workers were seen collecting them or carrying them back to the nest . N. ensifer ants are solitary foragers that work 25 ft (7 m) away from their home nest . N. ensifer predominately feeds on insects they prey on , consuming dead insects such as ichneumon wasps , bembicine wasps and small moths . When a worker discovers a dead insect , it will start to pull and carry it back to the nest immediately , and other nestmates will join once they detect it . Workers do not cooperate with each other and pull the insect from all directions , accidentally tearing it apart . However , the workers will eventually have a piece of the insect left and return it to the nest . The only known predator of N. ensifer is the giant horned lizard (Phrynosoma asio) . Mites and Springtail arthropods are known to dwell inside nests , but their function or purpose within a colony is unknown .

Nothing is known about its reproduction or nuptial flight . Collectors note that no alates or pupae resembling alate forms were found in excavated colonies between August and February , and the larvae collected were not large enough to be reproductive ants . However , it is possible that nuptial flight takes place in spring or summer , and like N. albisetosus and N.cockerelli , alates most likely start to occur by June . After nuptial flight , queens search for a suitable colony by building a chamber under objects such as stones and exposed roots of woody plants . This theory stated by entomologist Paul Kannowski is supported by the fact that these ants depend on stones buried in the soil for nest construction . The larvae and pupae are unsorted in the upper chambers of the nest that are joined together by hooked hairs on the side of the larvae . This arrangement most likely helps workers move the brood efficiently and keep them together in a group . Incipient colonies may only have 30 workers and brood in all life stages . Unlike the larvae and pupae , the eggs and queen are not found in the uppermost galleries , but rather they are found in the deepest chambers of the nest . In large nests , small workers resembling the first generation of brood are either rare or absent .