

*MISCHOCYTTARUS MEXICANUS CUBICOLA*  
(HYMENOPTERA), DISTRIBUTION AND NESTING PLANTS

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ABSTRACT

*Mischocyttarus mexicanus cubicola* was found in all of the Florida counties for which there were no previous collection records except for counties in the northwestern-most part of the state. Nesting plants were found to be oak, saw palmetto and cabbage palm. The latter plant appeared to offer the most protection from bird predation, nests being chiefly found under horizontal leaves. Weather conditions appear to be the most important factor influencing this species' dispersal.

RESUMEN

*Mischocyttarus mexicanus cubicola* fue encontrado en los condados de la Florida en los cuales no había sido colectado anteriormente, excepto por aquellos al extremo noroeste de dicho estado. Las plantas en las cuales se encontró anidando esta avispa fueron *Quercus* spp., *Serenoa repens* y *Sabal palmetto*, siendo esta última la que ofrece la mayor protección contra depredación hecha por pájaros. Los nidos fueron encontrados principalmente en las hojas horizontales. Aparentemente, las condiciones ambientales son el factor más influyente en la dispersión de esta especie.

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The distribution of *Mischocyttarus mexicanus cubicola* (de Saussure), based on collection data in pertinent U.S. museums, was reported on recently by Hermann and Chao (1984). This subspecies was found in that study to be distributed throughout most of Florida, although several counties were not accounted for in the collection data. *M. m. cubcola* was also found to be distributed in the coastal areas of Georgia and South Carolina and to a lesser degree in Alabama. Possible disjunct populations were found in Bay County, Alabama, Decatur County, Georgia, and Aiken County, South Carolina.

The present investigation was initiated to visit the counties in Florida in which this subspecies has not been reported and to gather information on nest site preference and possible limiting factors in its current distribution. Counties in other southern states along the Gulf coast also were investigated.

MATERIALS AND METHODS

This investigation involved a collection trip primarily along the east and west coast, south-central and northwestern parts of Florida, the Gulf coastal areas of Alabama and Mississippi and east-central Louisiana (total of 3125 miles) during the summer of 1984. In Florida, all of the counties from which *Mischocyttarus mexicanus cubicola* (Hermann and Chao 1984) has not been reported were closely examined for specimens. Collecting in the remaining states was limited primarily to the coastal areas.

During the initial stages of the trip, several types of vegetation were examined for wasp nests, as well as in and on abandoned buildings. Vegetation examined was chiefly

small oaks (*Quercus* spp.), saw palmetto (*Serenoa repens*) and cabbage palm (*Sabal palmetto*). Selection of these plants was based primarily on nest sites reported on in previous publications (Hermann and Chao 1984, Litte 1977) and the finding of these wasps in a *Quercus* sp. during the early summer of 1984.

When collections were made, the nest site on the plant and the relative abundance of nests were recorded. Data on percentages of trees and leaves upon which this species nested were not recorded since our main objective was to collect in all counties and obtain relative nesting information. Therefore, there was limited time in this project so that we were not able to spend a lot of time at any one location. Nests were taken along with specimens and have been deposited in the University of Georgia Entomology Collection.

### RESULTS

*Mischocyttarus mexicanus cubicola* was collected in 25 counties in Florida, 20 of which represent new county records. Therefore, all counties in that state in which this subspecies has not previously been collected (Table I), except for the northwestern part of the state, are now accounted for in the distribution of this subspecies (Fig. 1). Counties in the northwestern part of the state in which no specimens or nests were found (Fig. 1) nevertheless were examined closely for wasps.

Although this wasp subspecies has been found previously in all three of the vegetation types examined (Hermann and Chao 1984), it was found mainly in cabbage palm. Saw palmetto, very abundant throughout Florida, was also found to harbor abundant *Mischocyttarus* colonies. Use of these plants as nesting sites is supported by the report of Litte (1977). Whenever we found cabbage palms scarce, we spent most of our time looking at palmettos. However, the relative difficulty of collecting nests in saw palmetto in the time that we had allotted for this project and the relative ease with which this wasp subspecies was collected in cabbage palms led us to collect in the latter vegetation whenever possible.

*Mischocyttarus* was found to nest chiefly on the underside of horizontally oriented palm leaves, adjacent to the distal part of the leaf base (NS<sub>1</sub>, Figs. 2 and 3), on one side or the other of the midrib (MR). In addition, their nests were rarely found on the upper side of leaves that were older and in a hanging position (NS<sub>3</sub>, Fig. 4) and in complex folds of the palm leaves (NS<sub>2</sub>, Figs. 2 and 5). Such folds provided excellent protection for the nest against possible bird predation. Most live nests were found on living leaves. When colonies were abundant, nests were found on several leaves in a single tree.

Trees harboring the highest number of *Mischocyttarus* colonies appeared to be in and adjacent to small cities. On a number of occasions, numerous trees were examined in the countryside in which no or only a few colonies were found. Upon entering the edge of a city or town, colonies often were found to be relatively common. Colonies in larger cities were more scarce, possibly due to the spraying of pesticides or to pollution. This was strongly evident in Tallahassee (Leon County, Table I) where we examined numerous trees in the city and found only a single nest. However, even when *Mischocyttarus* was scarce, *Polistes exclamans* and *P. metricus* were sometimes abundant. It was generally true that when these two latter polistine species were not found in any of the cabbage palms in a particular area, neither was *Mischocyttarus*. There were exceptions to this, however.

In addition to nests of these three polistines, the sphecids, *Sceliphron cementarium* and *Trypoxylon politum*, and eumenids (potter wasps) were also found to use the underside of the leaf bases (NS<sub>1</sub>, Fig. 2,3) of these trees for their nesting sites.

*Mischocyttarus* was not found in Alabama or in any other state west of Florida,

TABLE 1. COUNTIES AND LOCALITIES FROM WHICH *Mischocyttarus mexicanus cubicola* WAS COLLECTED IN FLORIDA, JULY 21-AUGUST 2, 1984.

County	Locality	Collected Specimens <sup>1</sup>
Brevard*	Mims	(1N,8S), (1N,12S), (1N)
Citrus	Floral City (Hwy 48)	(1N,9S), (1N)
DeSoto	Arcadia	(1N,1S), (1N,2S), (1N,3S), (1N,7S)
DeSoto	Golden Grove Management Area (Hwy 70)	(1N,4S)
Dixie	North of Old Town (Hwys 19, 98, Alt 27)	(1N,7S)
Dixie	North of Old Town (Hwy 349)	(1N,10S)
Flagler	Bunnell	(1N,11S), (1N), (1N,7S), (1N)
Franklin	Eastpoint	(1N), (1N,1S)
Gilchrist	Trenton (County Jail)	(1N,13S), (2N,5S)
Glades	Brighton Seminole Indian Reservation (Hwy 78)	(1N,2S)
Hamilton	Jct. 129 & 75	(1N)
Hardee	Zolfo Springs	(1N,4S), (3N), (2N)
Hardee	North Gardner	(1N,5S)
Hendry	Ortona Lock Camp (Hwy 80)	(1N), (1N,1S)
Hernando	Jct. 70 & 50	(1N,5S)
Jefferson	Aucilla	(1N,4S)
Lafayette	Mayo	(1N), (1N,16S), (1N), (1N,1S), (1S), (1N), (3N,13S)
Leon	Tallahassee	(1N)
Madison	Madison	(1N,27S)
Manatee	Lake Manatee State Park	(2N,2S)
Marion*	Rainbow Lake Estates	(2N,6S)
Nassau		(1N), (1N,1S)
Okechobee	Fort Drum	(1N,5S), (1N,2S)
Polk*	Lake Kissimmee State Park	(1N)
St. Johns*		(1N,19S), (1N,1S), (1N,5S)
Sumpter	S. Catherine (Hwy 70) (Safari Campground)	(1N,9S), (1N,5S), (1N,1S), (1N,2S), (1N,4S), (1N,7S), (1N,5S)
Union	Starke, 11 mi. N. of Bradford line	(1N,5S), (1N,11S), (3N), (1N,9S)
Volusia*	Deltona	(1N,4S), (1N,2S), (1N,3S) (1N,5S)

<sup>1</sup>Each set of information in parenthesis represents an individual collection except where several nests are collected without specimens. N = Nests. S = Specimens. Counties marked by an asterisk are ones in which *M. m. cubicola* has previously been collected (Hermann and Chao, 1984).

although palm trees were examined whenever possible. It also was not found in the following 9 northwestern Florida counties: Bay, Calhoun, Escambia, Holmes, Jackson, Okaloosa, Santa Rosa, Walton and Washington (Fig. 1). These latter counties have never been found to have *Mischocyttarus* (Hermann and Chao 1984).

#### POSSIBLE DISPERSAL BARRIER

This species was common throughout Florida, except the northwestern part of the state, but local populations varied depending upon variations in nesting plants and local

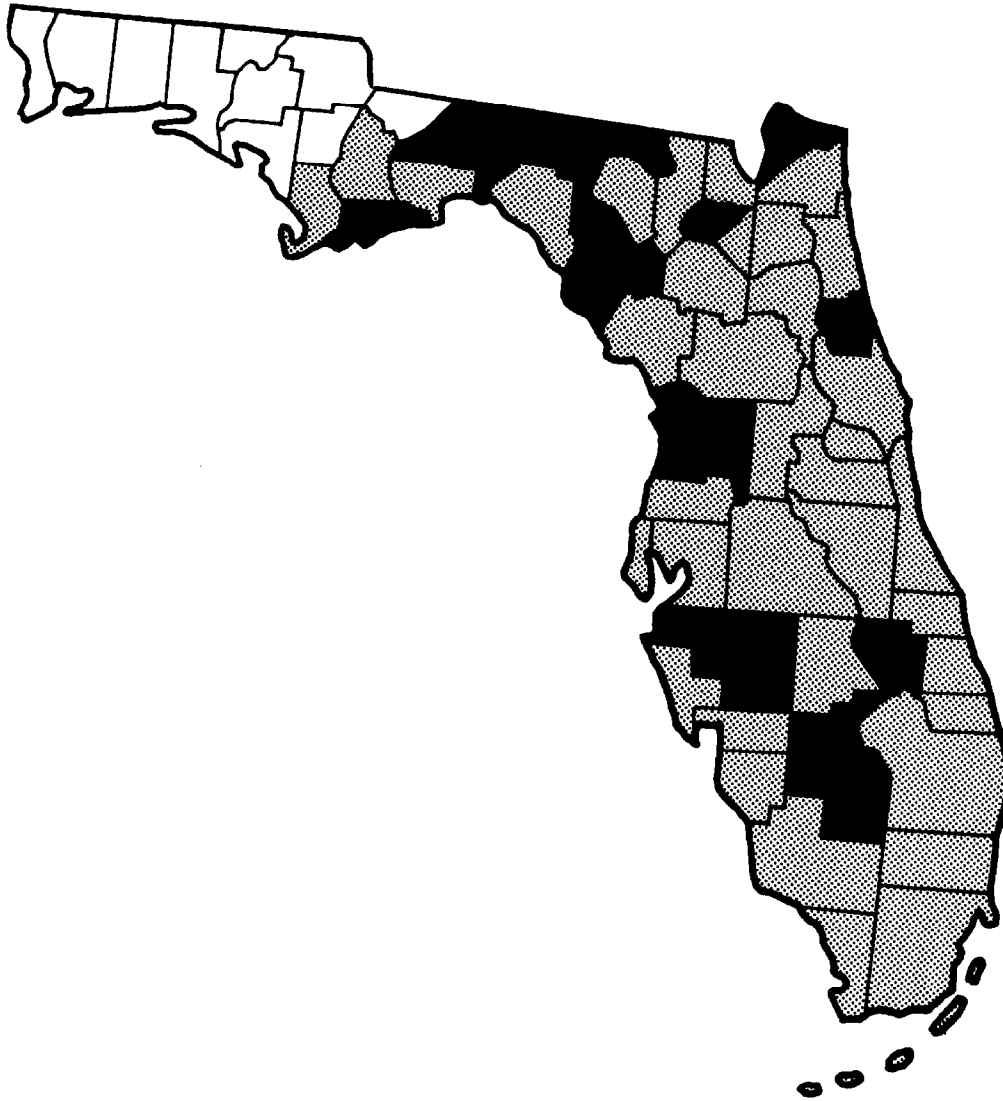


Fig. 1. Map of Florida, showing the newly recorded counties from which *Mischoctytarus mexicanus cubicola* was collected (blackened areas). Counties with lighter stipling are those for which there are previous records (Hermann and Chao 1984). *M. m. cubicola* has now been recorded from all Florida counties except for those in the extreme northwestern corner of the state (white areas).

prevailing conditions. Once we entered northwestern Florida, *Mischoctytarus* ceased to be found.

The westward spread of *Mischoctytarus* along the Gulf Coast appears to be kept in check by 2 possible factors: 1) there is a climatic difference toward the west and north so that the winters are too cold for this wasp to exist; 2) the heavy winds that sometimes occur along the Gulf Coast make it difficult for nesting to come about.

Although either of these reasons possibly can influence the nesting of this wasp, it probably is a combination of these factors that halts their dispersal in a westward direction. Since a single specimen of this wasp was found by Bohart in Mobile County,

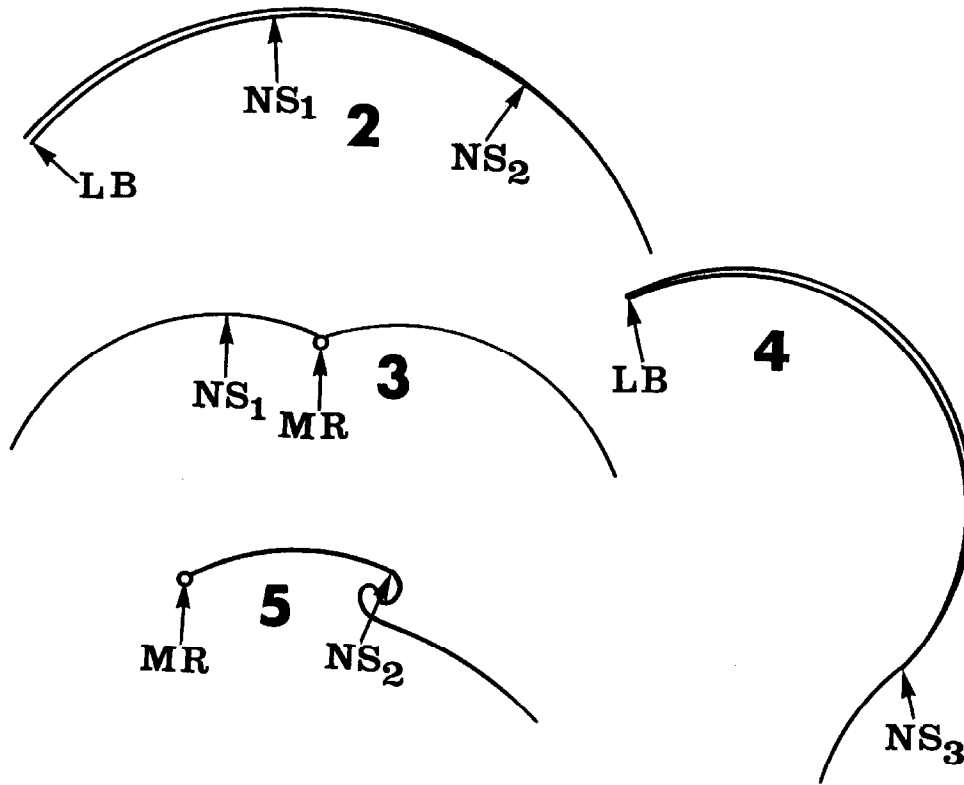


Fig. 2-5. Nesting sites (diagrammatic) of *Mischocyttarus m. cubicola* on the leaves of *Sabal palmelto* in Florida, July, 1984. 2. Diagrammatic lateral view of a horizontal leaf, showing relative nest site position, represented in transverse section in Fig. 3. 3. Diagrammatic transverse section of leaf, showing characteristic position of nest adjacent to leaf's mid rib (NS<sub>1</sub>). 4. Diagrammatic lateral view of older leaf past the horizontal stage of development, showing the position that occasional nests were found (NS<sub>3</sub>). Nests of *Polistes exclamans* were commonly found at this site. 5. Diagrammatic transverse section of leaf at a more distal position than leaf in Fig. 3, showing a complex fold and the nesting site therein (NS<sub>2</sub>). LB, Leaf base. MR, Mid rib of leaf. NS<sub>1</sub>, Nesting site near mid rib at distal end of leaf base. NS<sub>2</sub>, Nesting site distal of leaf base in complex leaf fold. NS<sub>3</sub>, Nesting site near apex of dorsal side of older leaf.

Alabama, in 1946 (Hermann and Chao 1984), it was either nesting in that location at that time, or it possibly was blown in from another area, or maybe the weather prior to 1946 was warm enough to allow a temporary westward dispersal. Possibly they are still there and we missed them. However, this latter consideration is doubtful. We examined numerous cabbage palms in the western Florida counties in which *Mischocyttarus* was not found. Whether cabbage palms were the prime nesting plant or not, we should have found some specimens or nests. There also were abundant saw palmettos in these areas. Therefore, the abundance of cabbage palms in an area that has other possible nesting sites should not be a factor that seriously influences dispersal.

*Mischocyttarus* appears to be especially sensitive to cold climates. The population at Sapelo Island, Georgia, was drastically reduced in 1984 due to extremely cold weather during December of 1983. There is no reason to believe that this is not true in other peripheral areas of its range as well. In the western-most counties of Florida where *Mischocyttarus* was not accounted for, neither did we find old nests (except for Leon

County, Table 1), indicating that this wasp had not been in those counties for some time. The single nest collected in Leon County was from a previous year. Since *Polistes exclamans* and *P. metricus* were found in cabbage palms in those counties, we assumed that conditions for nesting other than weather were favorable for *Mischocyttarus* also.

In the northwestern Florida counties where *Mischocyttarus* was becoming scarce we noticed freeze damage on the palm trees. Trees with freeze damage supported mostly brown leaves so that the only green leaves were in the top center of the plant. These were oriented vertically and not available as nesting sites. Whenever such damage was noticed, *Mischocyttarus* was not found. Such cold damage to palm trees also accompanied a lack of specimens at Sapelo Island, Georgia, during 1984. Therefore, it appears that in northwestern Florida, especially near the Georgia line, cold weather may be most important in halting dispersal. In the western counties along the Gulf Coast, occasional heavy winds may be an important influence in their lack of nesting there. *P. exclamans* and *P. metricus* generally were poorly represented in that area also. Possibly further inland, away from the direct affect of gulf winds, these wasps may be found in saw palmetto which is abundant in those locations along the Gulf Coast.

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