

THE CARPENTER BEES OF FLORIDA  
II. CERATINA  
(HYMENOPTERA: APIDAE: XYLOCOPINAE)<sup>1</sup>  
E. E. GRISSELL<sup>2</sup>

**INTRODUCTION:** IN AMERICA NORTH OF MEXICO CERATINA (SMALL CARPENTER BEES) IS ONE OF 2 GENERA OF THE SUBFAMILY XYLOCOPINAE. THE OTHER GENUS, XYLOCOPA (LARGE CARPENTER BEES), WAS DISCUSSED IN ENTOMOLOGY CIRCULAR 160 (GRISSELL, 1975). OF THE 21 SPECIES OF CERATINA IN AMERICA NORTH OF MEXICO, ONLY 2 ARE KNOWN TO OCCUR IN FLORIDA: C. COCKERELLI H. S. SMITH AND C. DUPLA SAY. MITCHELL (1962) DESCRIBED THE SUBSPECIES C. DUPLA FLORIDANUS FROM FLORIDA, BUT DALY (1973) SYNONYMIZED IT SIMPLY AS A MORE DENSELY PUNCTATE, BRIGHTER BLUE POPULATION OF THE TYPICAL EASTERN C. DUPLA. THIS CIRCULAR, ALONG WITH NO. 160, IS DESIGNED TO MAKE POSSIBLE THE SPECIES IDENTIFICATION OF ANY FLORIDA XYLOCOPINAE.

**IDENTIFICATION:** THE FAMILY APIDAE AND SUBFAMILY XYLOCOPINAE WERE CHARACTERIZED IN ENT. CIR. 160. CERATINA IS READILY SEPARATED FROM XYLOCOPA BY ITS SMALLER SIZE: ALL CERATINA (FIG. 1) ARE LESS THAN 8 MM LONG, WHILE XYLOCOPA ARE 20 MM OR LARGER. IN ADDITION, CERATINA HAS THE SECOND SUBMARGINAL CELL ABOUT AS HIGH AS WIDE BASALLY (FIG. 2), WHEREAS IN XYLOCOPA IT IS ABOUT HALF AS HIGH AS WIDE BASALLY (FIG. 3). THE SMALL CARPENTER BEES ARE BLACK, BLUISH GREEN, OR BLUE, AND OFTEN HAVE YELLOWISH OR WHITISH MARKINGS ON THE CLYPEUS, PRONOTAL LOBES, AND LEGS. THE 2 FLORIDA SPECIES OF CERATINA MAY BE SEPARATED AS FOLLOWS:

C. COCKERELLI (BOTH SEXES): BODY LENGTH 3-4.5 MM; HEAD AND THORAX MOSTLY BLACK, ABDOMEN BLACK WITH BROWNISH OR TAWNY AREAS; HEAD AND SCUTUM (DORSUM OF THORAX) MOSTLY POLISHED, WITHOUT PUNCTURES FOR THE MOST PART.

C. DUPLA (BOTH SEXES): BODY LENGTH 6-8 MM; BODY DARK METALLIC BLUE; HEAD AND SCUTUM WITH NUMEROUS DISTINCT PUNCTURES, NOT POLISHED.

**DISTRIBUTION:** CERATINA COCKERELLI IS FOUND THROUGHOUT FLORIDA AND MOST OF THE SOUTHERN COASTAL STATES FROM TEXAS TO GEORGIA (DALY, 1973). SPECIMENS HAVE NOT BEEN REPORTED FROM ALABAMA OR MISSISSIPPI, BUT PROBABLY OCCUR THERE. CERATINA DUPLA IS FOUND THROUGHOUT FLORIDA AS WELL AS MOST OF THE EASTERN UNITED STATES (DALY, 1973).



FIG. 1. CERATINA DUPLA  
(ABOVE, DORSAL VIEW;  
BELOW, SIDE VIEW)

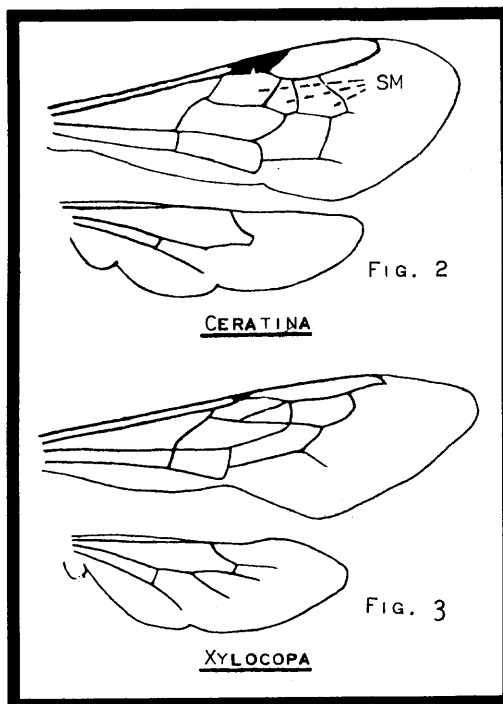


FIG. 2-3. WINGS OF XYLOCOPINAE  
(SM: SUBMARGINAL CELLS)  
(AFTER BORROR AND DELONG, 1971)

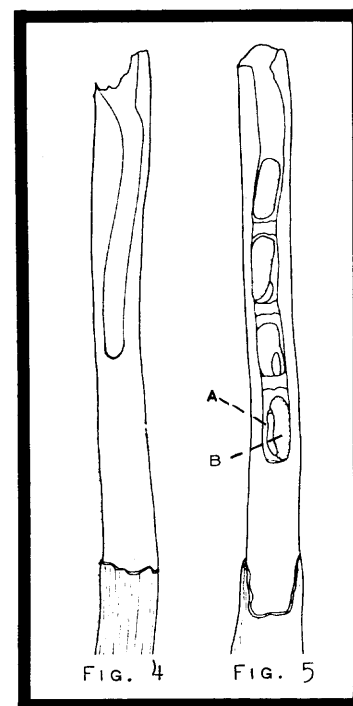


FIG. 4-5. NEST DIAGRAMS OF  
CERATINA. FIG. 4. OVERWINTERING  
NEST (HIBERNACULUM). FIG. 5.  
ACTIVE BROOD NEST (A: BEE LARVA;  
B: PROVISIONS) (AFTER DALY, 1966)

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**BIOLOGY:** IN GENERAL, MEMBERS OF THIS GENUS EXCAVATE NESTS WITH THEIR MANDIBLES IN THE PITH OF BROKEN OR BURNED PLANT TWIGS AND STEMS. FEMALES OVERWINTER AS ADULTS IN PARTIALLY OR COMPLETELY EXCAVATED STEMS (FIG. 4). IN THE SPRING THIS RESTING PLACE (HIBERNACULUM) IS MODIFIED INTO A BROOD NEST BY FURTHER EXCAVATION. RAU (1928) REPORTED SEVERAL NESTS OF C. CALCARATA ROBERTSON THAT RANGED FROM 20 TO 30 CM DEEP. DALY (1966) MEASURED 126 NESTS OF C. DALLATORREANA FRIESE WHICH RANGED FROM 3 TO 19 CM DEEP. WHEN A DESIRED DEPTH IS REACHED, THE FEMALE COLLECTS POLLEN AND NECTAR, PLACES THIS MIXTURE AT THE BASE OF THE BURROW, LAYS AN EGG ON THE PROVISION, AND THEN CAPS OFF THE CELL WITH MASTICATED PLANT MATERIAL. SEVERAL CELLS ARE CONSTRUCTED END TO END IN EACH PLANT STEM, THE ABSOLUTE NUMBER DEPENDING UPON THE DEPTH TO WHICH THE NEST WAS EXCAVATED. DALY (1966) FOUND A RANGE OF 2 TO 12 CELLS (19 COMPLETED NESTS EXAMINED) FOR C. DALLATORREANA. THE FEMALE WORKS AT A SINGLE STEM UNTIL IT IS FILLED WITH CELLS (FIG. 5), EACH OF WHICH CONTAINS PROVISIONS AND AN EGG OR LARVA, EXCEPT FOR THE LAST CELL NEAR THE NEST ENTRANCE. HERE THE BEE RESTS AND, ACCORDING TO MALYSHEV (1936) AND DALY (1966), PRESUMABLY DEFENDS HER NEST FROM INTRUDERS. THE FEMALE BEE REMAINS WITH THE NEST UNTIL HER PROGENY EMERGE. SINCE THE NEST HAS BEEN UNDER CONSTRUCTION FOR SOME TIME, THE OLDEST PROGENY (AT THE BASE OF THE NEST) MATURE AND BEGIN TO GNAW THEIR WAY OUT BEFORE THE OTHERS ABOVE THEM ARE READY. THIS POSES A SPECIAL PROBLEM BECAUSE THE BEES DO NOT EMERGE Laterally THROUGH THE SIDE OF THE STEM, BUT VERTICALLY THROUGH ALL THE OTHER CELLS. RAU (1928) DESCRIBED THIS PROCESS THOROUGHLY FOR C. CALCARATA. ESSENTIALLY THE OLDEST BEE CHEWED APART THE CELL CAP ABOVE AND PACKED IT AT THE BASE OF ITS OWN CELL. IF THE BEE ABOVE WAS NOT MATURE IT WAS CAREFULLY MOVED DOWN TO REST ON THE NEW "FLOOR." IF THE BEE ABOVE WAS MATURE, THE ELDEST PASSED IT BY AND WORKED ON THE CELL CAP ABOVE, PASSING THE PITHY MATERIAL TO THE YOUNGER BEE OR BEES BENEATH. THESE BEES PACKED THE MATERIAL AT THE BASE OF THE NEST, MOVING AND ADJUSTING ANY PUPAE WHICH REMAINED. THUS THE MATURE BEES AT THE BASE OF THE NEST GAINED FREEDOM BY ". . . A PROCESS OF DISPLACEMENT, GRADUALLY SHIFTING THE MATERIAL BEHIND THEM AS THEY MAKE THEIR WAY TO THE TOP" (RAU, 1928:390). THE PROCESS OBSERVED BY RAU TOOK 8 DAYS FOR THE ELDEST BEES TO MAKE THEIR WAY TO THE ENTRANCE; SEVERAL DAYS LATER ALL THE BEES EMERGED. SPECIAL BIOLOGICAL REFERENCES TO THE CERATINA OCCURRING IN FLORIDA ARE SCARCE. EXTENSIVE FLOWER VISITATION RECORDS WERE GIVEN BY MITCHELL (1962) AND DALY (1973). THE ONLY BIOLOGICAL RECORD FOR C. COCKERELLI WAS GIVEN BY DALY (1973:45) WHO CITED SAGE (IN LITT.) AS REPORTING NESTS ". . . IN DEAD, CUT STEMS OF SEA-OATS, UNIOLA PANICULATA L., ON THE BEACH OF MUSTANG ISLAND, TEXAS." REFERENCES TO C. DUPLA ARE NOT IN ABUNDANCE, BUT DALY (1973:51-52) CITED WHAT WAS KNOWN AT THAT TIME. THE MORE IMPORTANT PAPERS, THOUGH WHOLLY INADEQUATE, ARE ASHMEAD (1894:25-26), COMSTOCK AND COMSTOCK (1895:669-670), AND GRAENICHER (1905).

**ECONOMIC IMPORTANCE:** UNLIKE ITS LARGER RELATIVE XYLOCOPA, CERATINA IS NOT KNOWN TO BE OF ECONOMIC IMPORTANCE.

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