

THE HORNETS AND YELLOW JACKETS (VESPULA) OF FLORIDA

(HYMENOPTERA: VESPIDAE)<sup>1</sup>

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INTRODUCTION: ONLY 3 OF THE 16 NEARCTIC SPECIES OF VESPULA ARE KNOWN FROM FLORIDA (MILLER, 1961). THESE INCLUDE THE WHITE-FACED HORNET, V. MACULATA (LINNAEUS), AND 2 YELLOW JACKETS, V. MACULIFRONS (BUYSSON) AND V. SQUAMOSA (DRURY). IN GENERAL, THE TERM HORNET IS USED FOR VESPULA WHICH NEST ABOVE-GROUND AND THE TERM YELLOW JACKET FOR THOSE WHICH MAKE SUBTERRANEAN NESTS. ALL VESPULA ARE SOCIAL, LIVING IN COLONIES OF HUNDREDS TO THOUSANDS OF INDIVIDUALS. THESE WASPS ARE ADEPT AT STINGING AND ARE ESPECIALLY AROUSED IF DANGER THREATENS THE NEST. UNLIKE THE HONEYBEE, WHICH DIES UPON INFLECTING A SINGLE STING, VESPAINE WASPS MAY STING AS OFTEN AS THEY FIND A TARGET.

IDENTIFICATION: THE VESPULA SPECIES OF FLORIDA ARE READILY SEPARATED BY DIFFERENCES IN BODY COLOR AND PATTERN. IDENTIFICATION IS POSSIBLE WITHOUT HAND LENS OR MICROSCOPE, AND, FOR THIS REASON, A SIMPLE PICTORIAL KEY IS ALL THAT IS NECESSARY. COLOR PATTERNS ARE RELATIVELY STABLE, AND THEIR USE IS FURTHER STRENGTHENED BY MORPHOLOGICAL CHARACTERS (MILLER, 1961). QUEENS AND WORKERS MAY BE SEPARATED BY ABDOMINAL PATTERNS; MALES HAVE 7 ABDOMINAL SEGMENTS WHILE FEMALES HAVE ONLY 6.

VESPULA ABDOMENS

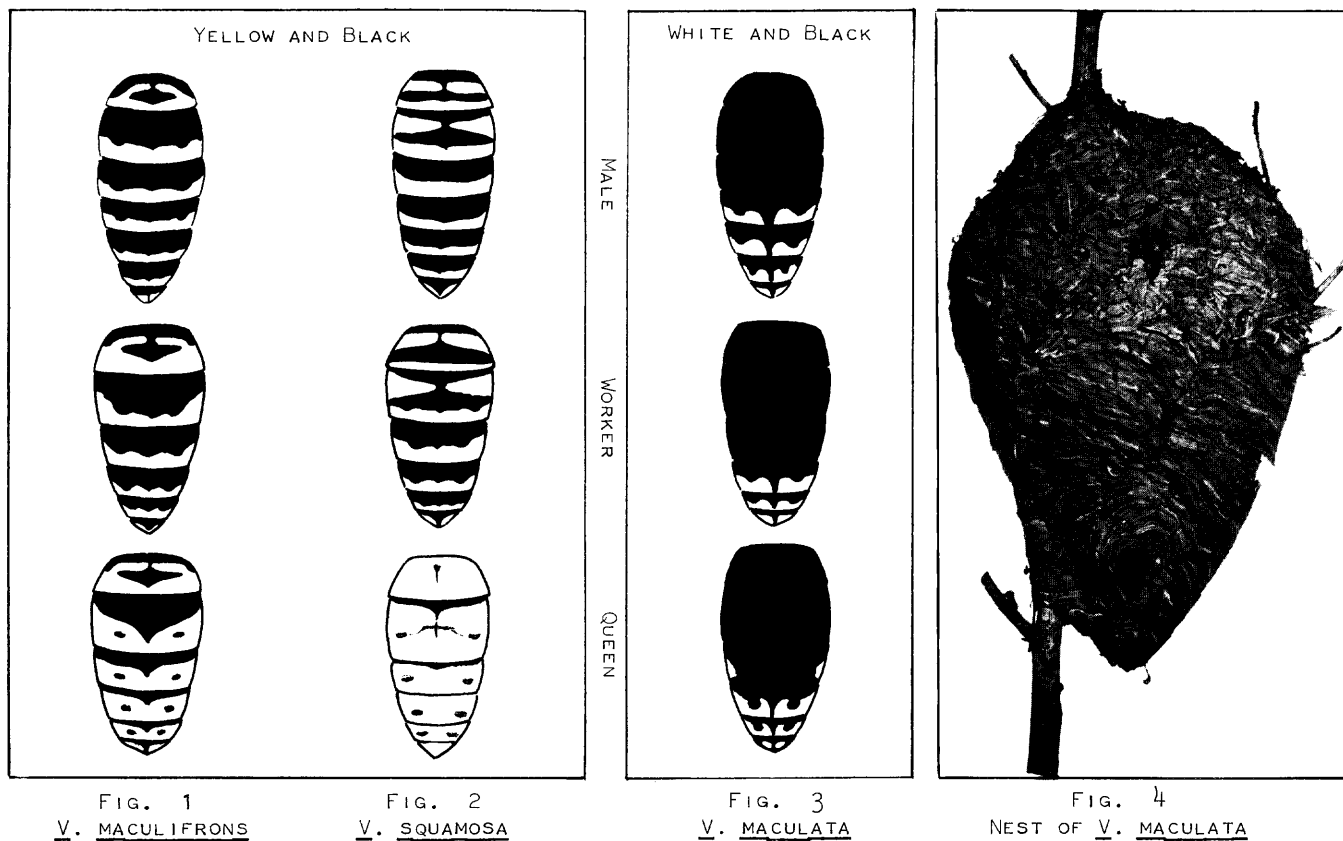


FIG. 1  
V. MACULIFRONS

FIG. 2  
V. SQUAMOSA

FIG. 3  
V. MACULATA

FIG. 4  
 NEST OF V. MACULATA

BIOLOGY: VESPULA COLONIES ARE FOUNDED IN THE SPRING BY A SINGLE QUEEN THAT MATED THE PREVIOUS FALL AND OVERWINTERED AS AN ADULT, USUALLY UNDER THE BARK OF A LOG. NESTS MAY BE AERIAL OR TERRESTRIAL, DEPENDING IN PART, UPON THE SPECIES OF WASP. SOME SPECIES MAY CONSTRUCT BOTH TYPES OF NEST. REGARDLESS OF LOCATION, EACH NEST IS A SERIES OF HORIZONTAL COMBS COMPLETELY SURROUNDED BY A PAPER ENVELOPE (FIG. 4). INITIALLY, THE SOLITARY QUEEN MUST NOT ONLY CONSTRUCT THE PAPER BROOD CELLS BUT ALSO FORAGE FOR FOOD, LAY EGGS, FEED HER PROGENY, AND DEFEND THE NEST FROM INTRUDERS. WHEN THE FIRST OFFSPRING EMERGE AS ADULTS THEY ASSUME ALL TASKS EXCEPT EGG LAYING. THE QUEEN DEVOTES THE REMAINDER OF HER LIFE TO THIS TASK AND DOES NOT LEAVE THE NEST AGAIN. FOR MOST OF THE SEASON THE COLONY CONSISTS OF STERILE WORKER FEMALES WHICH ARE NOTICEABLY SMALLER THAN THE QUEEN. EACH WORKER TENDS TO PERSIST AT A GIVEN TASK, SUCH AS NEST BUILDING OR FEEDING LARVAE, FOR A GIVEN DAY BUT MAY CHANGE TASKS IF THE NEED ARISES. WORKING HABITS APPARENTLY ARE NOT ASSOCIATED WITH AGE AS THEY ARE IN THE HONEYBEE. WORKERS PROGRESSIVELY FEED LARVAE A DIET OF MASTICATED FLESH OF ADULT AND IMMATURE INSECTS, OTHER ARTHROPODS, AND FRESH CARRION. LEPIDOPTEROUS LARVAE APPEAR TO BE A FAVORITE FOOD. IN AUTUMN, LARGER CELLS ARE CONSTRUCTED FOR THE

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CROP OF NEW QUEENS. LARVAE IN THESE CELLS RECEIVE MORE FOOD THAN DO THOSE IN NORMAL CELLS. AT THE SAME TIME, THE QUEEN BEGINS TO LAY UNFERTILIZED OR MALE EGGS IN EITHER LARGE OR SMALL CELLS. AFTER EMERGENCE, THE NEW QUEENS MATE AND SEEK SHELTER FOR THE WINTER. THESE WILL BE THE FOUNDERS OF NEXT SPRING'S COLONIES. THE OLD FOUNDER QUEEN DIES, AND THE WORKERS BEGIN TO BEHAVE ERRATICALLY UNTIL SOCIAL ORDER BREAKS DOWN. WITH WINTER'S ARRIVAL, THE REMAINING COLONY DIES.

VESPULA MACULATA (FIG. 3): THE WHITE-FACED HORNET IS FOUND THROUGHOUT MOST OF THE NEARCTIC REGION. IT CONSTRUCTS AERIAL NESTS OFTEN A FOOT OR MORE IN DIAMETER (FIG. 4). THE WASP IS EASILY RECOGNIZED BY ITS BLACK AND WHITE COLOR AND BY THE ANTERIOR HALF OR MORE (TERGA I-III) OF THE ABDOMEN WHICH IS BLACK. RELATIVELY LITTLE IS KNOWN ABOUT THIS SPECIES IN VIEW OF ITS ABUNDANCE AND WIDE DISTRIBUTION.

VESPULA MACULIFRONS (FIG. 1): THIS YELLOW JACKET IS FOUND IN EASTERN NORTH AMERICA. MOST REPORTS INDICATE SUBTERRANEAN NESTS. HAVILAND (1962) DESCRIBED 10 NESTS, EACH OF WHICH HAD A NEARLY SPHERICAL GROUND OPENING ABOUT 1.5 CM IN DIAMETER. THE NEST LOOKS MUCH LIKE THAT OF V. MACULATA EXCEPT THE OUTSIDE ENVELOPE HAS THE CONSISTENCY OF CHARRED PAPER. AS THE NEST BECOMES LARGER, WORKERS REMOVE SOIL FROM THE BURROW. THERE IS ALWAYS ABOUT 1 CM DISTANCE BETWEEN NEST AND SOIL. ACCORDING TO HAVILAND (1962) NESTS RANGED FROM 9.5 TO 30 CM IN DIAMETER. THE LARGEST NEST CONTAINED 8 LEVELS OF COMB WITH OVER 2800 WASPS PRESENT. GREEN, ET AL. (1970) REVIEWED SOME UNUSUAL ABOVE-GROUND NEST LOCATIONS OF V. MACULIFRONS INCLUDING DECAYED STUMPS, TREE CAVITIES, AND BETWEEN SIDINGS OF A HOME. THEY ALSO FOUND AN EXPOSED NEST ON THE SIDE OF A BUILDING. V. MACULIFRONS IS MOST READILY SEPARATED FROM V. SQUAMOSA BY THE COLOR PATTERNS SHOWN IN FIGS. 1 AND 2.

VESPULA SQUAMOSA (FIG. 2): THIS YELLOW JACKET IS FOUND IN THE EASTERN UNITED STATES AND PARTS OF MEXICO AND CENTRAL AMERICA. AS WITH V. MACULIFRONS, BOTH TERRESTRIAL AND AERIAL NESTS ARE KNOWN. GAUL (1947) DESCRIBED ONE GROUND NEST WHICH WAS 20 CM WIDE BY 10 CM DEEP. THE NEST WAS 22.5 CM BELOW THE SOIL SURFACE. TISSOT & ROBINSON (1954) DESCRIBED 5 AERIAL NESTS FOR V. SQUAMOSA. TWO NESTS WERE CONSTRUCTED IN MATERIAL ASSOCIATED WITH PALM AND ANOTHER IN A ROLLED RUG IN A GARAGE. A HUGE NEST, ABOUT 2.5 M IN HEIGHT, WAS CONSTRUCTED AROUND THE END OF A TREE STUMP. A TOTAL OF 74 LAYERS OF COMB WERE FOUND. EVIDENCE SUGGESTED THAT THIS NEST MIGHT HAVE BEEN A COALITION OF 2 OR 3 INDEPENDENTLY FOUNDED COLONIES OF V. SQUAMOSA ON THE SAME TREE.

ECONOMIC IMPORTANCE: VESPULA PERFORM A VALUABLE SERVICE IN DESTROYING MANY INSECTS THAT ATTACK CULTIVATED AND ORNAMENTAL PLANTS. NESTS NEAR HOMES, HOWEVER, MAY PROVE A SOURCE OF IRRITATION. IF THE NESTS ARE LARGE OR DIFFICULT TO APPROACH, FOR EXAMPLE WITHIN THE WALLS OF A HOUSE, THE SAFEST PROCEDURE WOULD BE TO HIRE A PEST CONTROL OPERATOR TO ELIMINATE THE COLONY. ANY ATTEMPT TO REMOVE OR DESTROY NESTS BY THE LAYMAN SHOULD BE DONE AT NIGHT WHEN NEST ACTIVITY IS AT A MINIMUM. IT IS IMPORTANT TO NOTE THAT EVEN THOUGH NESTS ARE RELATIVELY INACTIVE AT NIGHT, ANY DISTURBANCE WILL RESULT IN INSTANT ACTIVITY BY THE COLONY. IT IS NECESSARY TO WORK CAUTIOUSLY BUT QUICKLY. PROTECTIVE CLOTHING IS ADVISABLE. THE UNIVERSITY OF FLORIDA, IFAS, RECOMMENDS SPRAYING AERIAL NESTS WITH AN INSECTICIDE HAVING RAPID KNOCKDOWN PROPERTIES SUCH AS DICHLORVOS (DDVP). A PRESSURIZED CONTAINER SHOULD BE USED SO THE APPLICATOR MAY STAND AS FAR AWAY FROM THE NEST AS POSSIBLE. SPRAY IS FIRST DIRECTED AT THE NEST OPENING, AND THE ENTIRE NEST IS THEN SOAKED. FOR NESTS BELOW GROUND A 5% CHLORDANE DUST SHOULD BE DIRECTED INTO THE OPENING WHICH IS PLUGGED AS QUICKLY AS POSSIBLE. PURDUE UNIVERSITY (EXTENSION SERVICE, ENTOMOLOGY DEPARTMENT) RECOMMENDS 1 TEASPOON OF 45% CHLORDANE EC IN 1 QUART OF WATER POURED DOWN THE NEST OPENING. MORE THAN ONE APPLICATION MAY BE NECESSARY. UNPUBLISHED DPI REPORTS INDICATE THAT SEVIN (WETTABLE POWDER OR DUST) PROVIDES RAPID KNOCKDOWN FOR AERIAL AND SUBTERRANEAN COLONIES AND LEAVES NO RESIDUE.

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