

Comparative Ethology of Solitary Wasps  
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General remarks: Studies of this type are of necessity rather opportunistic, i.e., one has to take advantage of the species abundant in the area that season. Most solitary wasps exhibit large fluctuations in abundance. For this reason, my research this year developed along somewhat different lines than anticipated.

1. Determination of factors involved in orientation to clusters in Steniolia obliqua. A good deal was learned about the general features of clustering in 1961. I wished further to determine whether these insects secrete a pheromone which guides them to the cluster each evening, or whether they merely remember visual cues (as they do with respect to the nest). I found only one cluster this year, and this contained only 60 wasps at its maximum. My experiments were therefore limited and could not be repeated. So far as they go, these experiments indicate that a pheromone is not involved, but that the clustering sites are found in much the same way as the nesting sites. I doubt if it will be possible to go further in this area, as the population of Steniolia is declining steadily (D. Lowrie has sent me his data over several years). I have been unable to find the species in other parts of Jackson Hole. Any reports of clusters elsewhere would be welcomed.
2. Nesting behavior of Stictiella emarginata. I located this species in some numbers near the station in 1961, but did not have time to study it. This year I collected only two individuals and, after a prolonged search, was quite unable to locate any nests. This is an unusual species structurally, and may exhibit some unusual behavioral features. The prey consists of moths.
3. Further studies of Bembix amoena in Yellowstone. I studied a colony at South Entrance in some detail in 1961. I wished to make a brief comparative study of a colony at some distance away, to determine how well the supposed distinctive features held up. A large colony near Madison Jct. served very well and demonstrated that the behavior is subject to little variation, at least over that range. This colony is very heavily parasitized, and I obtained much additional data on parasitism.
4. Ethology of Ammophila (sp. as yet undetermined) at the Cattlemen's Bridge. This species was remarkably abundant this year, and I spent much time working on it. The behavior proves to be the most advanced and complex of any American sp. of this genus which has been studied. For one thing, the females maintain more than one nest at a time, a feature proved for only one other digger wasp (of any group), the European Ammophila pubescens. I was unable to do complete justice to this species this year, and will need to spend more time with it, marking all individuals in the colony. This year I marked only five, and obtained complete day-to-day records for only one.

5. General survey of the digger wasps along the Snake River between the station and the Cattlemen's Bridge. This was begun in 1961 and will need another one or two summers, at least, to complete. I wish to learn not only the spp. present (there may be 50 or more) but their parasites and prey. There are many inter-relationships among these species; for example, three spp. of Philanthus prey upon other wasps, several of the wasps share the same parasites, etc. In general, there is little or no competition for prey or nesting sites. Many of the wasps are little known (one studied in 1961 had to be described as new). The following are some of the species involved (some are abundant and conspicuous, others scarce, small, and/or secretive):

Well studied spp.

Bembix spinolae  
 Steniolia obliqua  
 Hoplisoides nebulosus  
 Oxybelus quadrinotatus  
 Episyron 5-notatus  
 Nitelopterus evansi  
 Podalonia robusta  
 Plenoculus davisi

Spp. studied this year

Philanthus (3 spp.)  
 Cerceris (2 spp.)  
 Xylocelia sp.  
 Ammophila sp.  
 Stenodynerus sp.  
 Crossocerus sp.  
 Tachysphex (3 spp.)

Spp. as yet unstudied or virtually so

Stictiella emarginata  
 Dienoplus sp.  
 Astatia (3 spp.)  
 Anoplius tenebrosus  
 Pompilus (4 spp.)  
 At least 10-20 other spp.

Publication: Much of the data gathered will be used in a book-length manuscript now approaching completion, titled "Comparative ethology and evolution of the nyssonine sand wasps" will eventually be forthcoming, and I would hope some day to prepare a report on the ecology and inter-relationships of the wasps occurring along the Snake River at and near the station (item 5 above).

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