



Ants of Assateague Island National Seashore

Formicidae

Background

Ants are members of the family Formicidae and play important roles in terrestrial food webs. They act as seed dispersers, food for insectivores, and can be herbivores, predators, decomposers, etc. They are eusocial insects and are characterized by colonial living, cooperative care of juveniles, a reproductive division of labor, overlapping generations, and specialized roles within a colony.

Little is known about ants on Assateague Island. The objectives of this research were to examine ant biodiversity and the ecological role they play in the dune and forest habitats within the food web.

Status and Trends

In North America there are approximately 1,000 species of ants and only 124 species reported in Maryland. As global temperatures rise, populations will be susceptible to change. In the southeastern United States, rising temperatures are predicted to cause a decrease in ant biodiversity, while in northern ecoregions, it will likely increase as species expand their range.

To understand an ant's role at the community level, knowledge of biodiversity, feeding preferences, and trophic position in a food web are needed. On Maryland's Eastern Shore most species have been observed to be omnivorous or carnivorous and opportunistic feeders, feeding on obtainable plants and arthropods. This research, conducted by Salisbury University, provides the first analysis of feeding preferences of ants on Assateague Island.

Monitoring Ant Biodiversity

To monitor ant biodiversity, it is important to know which species are present and in which habitats they reside. In this 2019 study, researchers examined species richness of ants in two habitats: dunes and forests. Pitfall traps were utilized which allows for passive collection of both diurnal and nocturnal ants.

The pitfall traps consisted of a small plastic cup buried in the ground, so the opening was flush with the surface. Five pairs of 100 m transects with pitfall traps set every 10 m were established in the forests and dunes. The traps were set out once a month and were collected after a seven-day period. All ant specimens were later identified.



Ants in dunes at Assateague Island National Seashore.
Source: ASIS NPS, Salisbury University

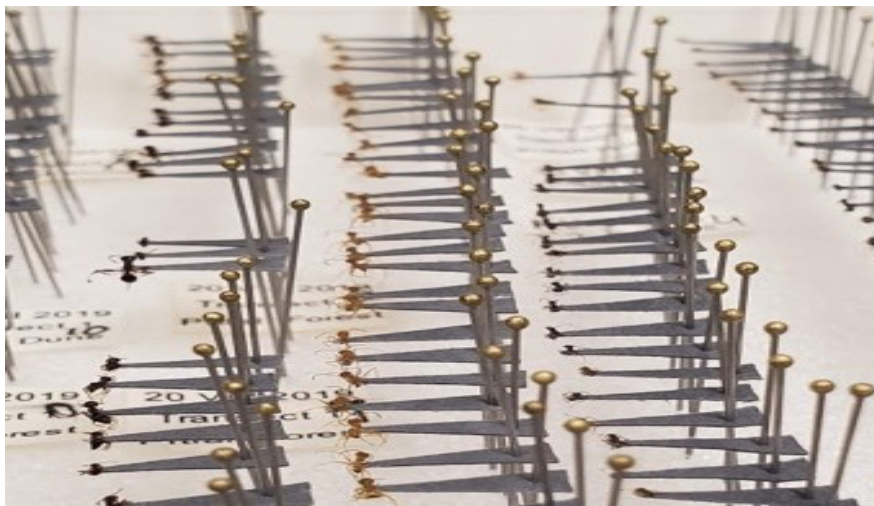
A total of 26 species were collected during this study. Twenty-four species were collected from the forest habitats and 14 species from the dunes. Eleven species collected in the forest were not recorded in the dunes and just 2 species collected in the dunes were not recorded in the forest. The forests have a higher species richness, showing that it can host a higher variety of ant species. Nine new species were added to the Assateague Island ant checklist. Twenty-nine species had previously been reported by Foard (2009), bringing the list to a total of 38 ant species.

Monitoring Ant Feeding Preferences

Stable isotope studies of carbon and nitrogen are used to detangle food webs and determine feeding preferences. These studies take advantage of the variation in the proportion of the heavy to light isotopes of carbon and nitrogen found in animals and plants due to differing physiochemical reaction rates.

For use in the isotope study, ants were collected by hand into vials using aspirators, nets, and forceps. Collection was conducted along two transects in the dune and two in the forest. Other arthropods and plants found along the transects were collected as they were deemed to be potential food resources. All samples underwent stable isotope analysis and the amount of natural stable isotopes ^{13}C and ^{15}N , as well as %C, and %N for each sample were calculated by the University of Maryland Center for Environmental Science.

When comparing the ants ^{13}C and ^{15}N composition, it was discovered that ants within the dunes were significantly more enriched in ^{13}C than those in the forests. Assateague's dunes are near the Atlantic Ocean, suggesting dune species may consume some food from the marine food web. Marine food resources are often more enriched in ^{13}C . Ant species in the dunes may be generalists or preferentially feed on marine food sources resulting in the elevated ^{13}C values. Further isotope research will be needed to determine which marine food resources dune species are utilizing.



Above: Researchers collected ants and later labeled and identified them by species in the lab. For the isotope study researchers collected ants by using an aspirator (middle photo). Source: Salisbury University



Assateague Island National Seashore
7206 National Seashore Lane
Berlin, MD 21811

<https://www.nps.gov/asis/index.htm>

Written by: Denise Manole, Salisbury University and
Olivia Butler, Scientists in Parks (SIP) Intern