

PRELIMINARY RESEARCH PROPOSAL ON THE ECOLOGY OF THE SPARASSID
DUNE SPIDERS OF THE CENTRAL NAMIB DESERT.

J.R. HENSCHEL

INTRODUCTION

The dune field of the Namib Desert near Gobabeb is inhabited by a variety of spiders from the family Sparassidae of which three genera (Leucorchestris, Orchestrella and Carparachne) and seven species have been identified (Lawrence 1962, 1965a & b; 1966). These large spiders occur only in the Namib desert, but to date, little is known about their role in this ecosystem.

A proposed study on the ecology of the most important of the Sparassidae near Gobabeb is outlined. It is recognized that some of the objectives, especially those listed in section 1B (Behaviour), could reach beyond the scope of a two to three-year project. As these could change after a literature review, this proposal should be regarded as tentative.

The general objectives of the proposed study are to determine the distribution, habitat utilization, prey selection, predator-prey relations, energy requirements, population parameters and predation on each of the important sparassid dune spiders. By comparing the different genera/species (it is not yet certain to which level observed spiders can be identified in the field), the ecological role of the spider community can be evaluated.

METHODS

1. Preliminary Survey
 - a) Pit-trap spiders in dune streets and on dunes;
 - b) Identify Sparassidae, looking for field-recognizable features of each genus/species;
 - c) Determine occurrence of the genera/species at various localities relative to physical landscape features;
 - d) Establish laboratory caging techniques;

- e) Test colour codes and/or fluorescent marks on carapace, compared to frequency of molting (sexually mature spiders should not molt; Foelix 1981);
- f) Test night observation with flashlight or U.V. light (Lamoral 1979) and genus/species recognition by behaviour;
- g) Locate nests in field by examining sand surface after spider activity (dawn), mark nest sites, finally excavate all nests that have been located in a certain region and identify occupants (refrigerate to facilitate handling);
- h) Mark and release spiders the following evening;
- i) Test field techniques e.g. ability to observe marked spiders at night;
- j) Plan data collection and analysis;
- k) Select main study sites.

2. Field study

- a) Mark spiders in selected study areas, as described above;
- b) Observations by foot or manual vehicle;
- c) Collect, weigh and measure size of fresh remains of spider prey;
- d) Determine spider density (e.g. mark-resighting, total nest count etc.);
- e) Determine prey abundance (using techniques from previous studies);
- f) Regular trapping of spiders in other areas to determine occurrence of other spider families, and to determine population parameters and seasonal reproductive changes of the Sparassidae;
- g) Energy and water-turnover determination with tritiated water.

3. Laboratory Study

- a) Observe basic behaviour characteristics e.g. nesting, social behaviour;
- b) Age determination, growth and molting;
- c) Determine degree of carcass utilization;
- d) Standardize energy and water-turnover determination technique.

OBJECTIVES

1. For each important genus/species determine:-

A: Role in the Ecosystem

- a) Distribution;
- b) Diet :
 - i) prey consumed
 - ii) quantity consumed
 - iii) energy requirements
 - iv) foraging and hunting behaviour;
- c) Population parameters :
 - i) density
 - ii) sex ratio
 - iii) age structure (size frequency);
- d) Prey density;
- e) Predation on spiders :
 - i) predator identity and predation method;
 - ii) spider mortality rate
 - iii) spider anti-predator behaviour.

B: Behaviour

- a) Spatial organization :
 - i) home range size and territoriality (?)
vs. prey abundance and distribution
 - ii) consistency of nest site use and distance
between nests
 - iii) spatial relation of sexes;

- b) Nesting behaviour :
 - i) nest construction and maintenance
 - ii) location of nest site (relative to vegetation and soil type, dune slope etc.)
 - iii) microclimate in nest;
- c) Activity pattern :
 - i) timing, duration and distance of activities in relation to prey activity pattern
 - ii) climate effects (e.g. fog, wind, temperature);
- d) Reproduction :
 - i) social behaviour
 - ii) reproductive season
 - iii) cocoon construction and care
 - iv) number of hatchlings and their fate
 - v) growth rate, molting and longevity
 - vi) recruitment rate to mature adult population.

2. Compare the different genera/species:-

- a) Relationships between coexisting spiders :
 - i) behaviour at encounter
 - ii) comparative ecology (competition ?);
- b) Compare behaviour along phylogenetic lines;
- c) Role of spider-community in dune ecosystem.

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