Great Basin Naturalist

Volume 49 | Number 3 Article 8

7-31-1989

Opportunistic foraging by the kangaroo rat *Dipodomys deserti* Stephens (Rodentia: Heteromyidae)

Richard W. Rust
University of Nevada, Reno

OPPORTUNISTIC FORAGING BY THE KANGAROO RAT *DIPODOMYS DESERTI* STEPHENS (RODENTIA: HETEROMYIDAE)

Richard W. Rust[1]

ABSTRACT.—The kangaroo rat, *Dipodomys deserti* Stephens, was observed capturing and killing insects that were flying about an ultraviolet lamp. The white-lined sphinx moth, *Hyles lineata* (F.), and the carrot beetle, *Bothynus gibbosus* (DeGeer), were put into the cheek pouches and carried away from the collection area.

Heteromyid rodents are chiefly granivores whose foraging is enhanced by externally opening, paired, fur-lined cheek pouches (Hall 1981). Recent studies (Brown and Lieberman 1973, Reichman 1975, Brown et al. 1979, Bowers 1982, Price and Brown 1983) have demonstrated the use of seeds in the diet of heteromyid rodents. Schmidt-Nielsen (1964, 1979) showed that species of *Perognathus* and *Dipodomys* could be maintained in positive water balance in the laboratory on carbohydrate-rich, air-dried seeds as the sole energy and water source. However, Reichman (1975) found 15.5% of *Dipodomys merriami* Mearns and 16.2% of *Perognathus intermedium* Merriam diets to be insect. Harris (1986) found that *Microdipodops megacephalus* Merriam ate primarily arthropods. Jameson (1954) and Kritzman (1974) have shown Lepidoptera larvae to be important food for *Perognathus*.

Presented here are observations of carnivorous feeding in a large, seed-eating heteromyid, *Dipodomys deserti* Stephens. These observations were made over a four-night period in May 1987 at Eureka Sand Dune, Inyo County, California.

RESULTS

While I was collecting nocturnal insects with an ultraviolet lamp suspended over a collecting sheet, a *Dipodomys deserti* approached the sheet and began capturing, killing, and storing various beetles and moths in its cheek pouches (Fig. 1). During the first night (May 2), the kangaroo rat made several trips to the sheet and then finally stopped hunting, possibly due to the harassment of being photographed. The rat appeared the second night at approximately 20:30 hr and made eight undisturbed hunting sessions until the lamp was turned off at 23:00 hr.

The hunting sessions lasted an average of 7.1 ± 3.2 (SD) minutes (n = 8, range 3–12 minutes). Identifiable insects captured and removed were the white-lined sphinx moth, *Hyles lineata* (F.) (Lepidoptera: Sphingidae) and the carrot beetle, *Bothynus gibbosus* (DeGeer) (Coleoptera: Scarabaeidae). The rat took an average of 1.0 ± 0.7 (n = 8, range 0–2) white-lined sphinx moths and 1.6 ± 1.0 (n = 8, range 0–3) carrot beetles in the 2.5-hr hunting period. Many smaller beetles, mostly Scarabaeidae, and smaller moths were also captured and removed. The rat actively avoided all scorpions encountered near the collecting sheet.

Dipodomys deserti was adroit at handling and capturing moths and beetles. White-lined sphinx moths were even captured in the air as they approached the ultraviolet lamp. The rat removed their heads and wings (Fig. 1 foreground) before placing them in its cheek pouches. Beetles were bitten several times and then stored for transport.

The same spot was visited and the ultraviolet light was used five days later (May 8), but no *D. deserti* appeared during two nights of collecting. A *Dipodomys merriami* did approach the lamp and collecting sheet but did not respond to any of the insects present.

DISCUSSION

Were these observations a rare event or a regular feature of *Dipodomys deserti* feeding

[1]Department of Biology, University of Nevada, Reno, Nevada 89557.

Fig. 1. *Dipodomys deserti* Stephens with a white-lined sphinx moth, *Hyles lineata* (F.), in its forepaws. Note the head of another white-lined sphinx moth on the sheet in the foreground.

behavior? Several lines of evidence suggest that it may not be that unusual for heteromyids to capture insects (Jameson 1954, Kritzman 1974, Reichman 1975, Harris 1986). The white-lined sphinx moth and carrot beetle are common throughout western deserts (Bechtel et al. 1982, Holland 1903, Powell and Hogue 1979). Both species fly at night in search of oviposition and feeding sites and would be present in the dune environment. The ease with which moths and beetles were captured and dispatched and with which scorpions were avoided suggests the kangaroo rat was familiar with these arthropods.

ACKNOWLEDGMENTS

I thank Colleen Cripps for commenting on the manuscript and my Biology 320 class for allowing me to make the undisturbed observations and for assisting me in recording captures.

LITERATURE CITED

BECHTEL, R. C., L. M. HANKS, AND R. W. RUST. 1983. The Coleoptera of Sand Mountain and Blow Sand Mountains, Nevada. Southwest Nat. 28: 473–478.

BOWERS, M. A. 1982. Foraging behavior of heteromyid rodents: field evidence of resource partitioning. J. Mammal. 63: 361–367.

BROWN, J. H., AND G. A. LIEBERMAN. 1973. Resource utilization and coexistence of seed-eating rodents in sand dune habitats. Ecology 54: 788–797.

BROWN, J. H., O. J. REICHMAN, AND D. W. DAVIDSON. 1979. Granivory in desert ecosystems. Ann. Rev. Ecol. Syst. 10: 201–227.

JAMESON, E. W. 1954. Insects in the diet of *Perognathus parvus*. J. Mammal. 35: 592–595.

KRITZMAN, E. B. 1974. Ecological relationships of *Peromyscus maniculatus* and *Perognathus parvus* in eastern Washington. J. Mammal. 55: 172–188.

HALL, R. E. 1981. The mammals of North America. Vol. 1. 2d ed. J. Wiley and Sons, New York.

HARRIS, J. H. 1986. Microhabitat segregation in two desert rodent species: the relation of prey availability to diet. Oecologia 68: 417–421.

HOLLAND, W. J. 1903. The moth book. Doubleday, Page, and Comp., New York.

POWELL, J. A., AND C. L. HOGUE. 1979. California insects. University of California Press, Berkeley.

PRICE, M. V., AND J. H. BROWN. 1983. Patterns of morphology and resource use in North American Desert rodent communities. In: Biology of desert rodents. Great Basin Nat. Mem. 7: 117–134.

REICHMAN, O. J. 1975. Relation of desert rodent diets to available resources. J. Mammal. 56: 731–751.

SCHMIDT-NIELSEN, K. 1964. Desert animals: physiological problems of heat and water. Clarendon Press, London.

———. 1979. Animal physiology: adaptation and environment. 2d ed. Cambridge University Press, Cambridge, England.