SPECIES-CHARACTERISTIC RESPONSES TO CATNIP BY UDOMESTICATED FELIDS

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Abstract—Thirty-three large felids belonging to six different species were exposed to catnip and catnip extract. The species-characteristic response to catnip and the sensitivity of the response to various concentrations of catnip were examined. Putative relationships between catnip sensitivity, species range, age, estrous cycle, and behavioral complexity are discussed. The behavioral response to catnip shown by the domestic cat is seen in several different large felids. Lions and jaguars were extremely sensitive to catnip compared to tigers, cougars, and bobcats, who gave little or no response. Both males and females of the same species tested alike. Reproductive-age adults were more sensitive than either aged or immature animals. It was quantitatively demonstrated that catnip responsiveness is not limited to the domestic cat, that it is not limited to the female, and that it varies dramatically between species and age of felids.

Key Words—catnip, olfaction, behavior, threshold response, felines, sensitivity.

INTRODUCTION

The first record of the domestic cat's peculiar response to catnip (Nepeta cataria) is lost in time. It is well known, however, that catnip stimulates an "innate releasing mechanism" (IRM) in domestic cats that elicits a predictably...
"playful" behavior pattern apparently independent of experience and learning (Ewer, 1973 and Leyhausen, 1975). *Cis, trans*-nepetalactone (Waller et al., 1969; McElvain et al., 1942; McElvain and Eisenbraun, 1955) is reported to produce this behavioral response and to be metabolized by cats. Other reports assign activity to *cis, trans* nepetalactone (Bates and Siegel, 1963). It has been verified by Todd (1963) that the response to catnip is mediated by olfactory and not gustatory stimuli. Catnip sensitivity has been related to a dominant autosomal gene and to the estrous cycle by Todd (1962). These reports indicated that catnip elicits certain behavioral responses in some of the domesticated as well as undomesticated cats, but these responses have not been shown to be species specific, typical of, or limited to the female sex. In addition, it has been suggested (Todd, 1963) that catnip mimics a pheromone found in cat urine; however, evidence supporting this theory is scant.

An unpublished attempt to relate the catnip response to different felids (Todd, 1963) utilized catnip leaves and recorded stereotyped behavioral responses. There are shortcomings in this approach. Qualitative descriptions of behavior are often inadequate criteria by which to assess sensitivity to catnip.

The present experiments were designed to investigate the qualitative and quantitative aspects of catnip sensitivity by testing undomesticated felids with respect to control and experimental (catnip-containing) objects. In addition, catnip extracts sprayed onto targets objects were employed in order to carefully control the amount of stimulating material and study felid sensitivity to reduced amounts of material.

The types of behavior which occur as positive responses to catnip were first identified and described. Two experiments were then performed to determine species differences in the response to catnip. Finally a procedure for demonstrating sensitivity thresholds was developed.

**EXPERIMENT 1: THE RESPONSE OF FELIDS TO CATNIP-FILLED BOXES**

Animals were presented with stimuli attached to the outside of their cage in a way that allowed them to approach the experimental and control stimuli but eliminated touching or tasting the sample.

*Methods and Materials*

The behavioral response and sensitivity to catnip of the undomesticated felids at the Knoxville Zoological Park was examined in thirty-three cats of various ages maintained in cages (Table 1). All experimental animals had been born and raised in captivity. The cats were tested during the months of March