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FOOD HABITS OF THE COMMON TOAD, *BUFO STOMATICUS*

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*A sample of 408 specimens of the common toad, **Bufo stomaticus** Lutken, was collected from March through December from the campus of the University of Agriculture, Faisalabad. About 75% of the toads carried food in their stomachs; the average number of food items per stomach being 3.6. Ants (57%) and beetles (24%) were the main constituents of the diet of the toad. Other constituents included, in order of importance, armyworms and caterpillers (10.0%), bugs (4.9%), snails (2.6%), termites (1.1%), spiders (0.6%), crickets and grasshoppers (0.6%), millipedes (0.3%) and houseflies (0.1%). A few grains of wheat (0.5%) were also present. Ants and beetles were eaten throughout the study period, whereas consumption of other food items was restricted to particular months or seasons.*

INTRODUCTION

Six species of *Bufo* have been reported to occur in Pakistan (Minton, 1966). Of these, the common toad, *Bufo stomaticus* Lutken is the most common and widely distributed in the Indo–Pak Subcontinent.

During the warmer months of the year the common toad can be seen feeding on insects under street lamps, in gardens and in and around buildings and human dwellings. Besides human habitations, the toad also affects agricultural fields in fairly good numbers. Its high density and predilection for insects makes it an ally of the farmer. The importance of the toad as a destroyer of insects motivated this study which was aimed at knowing its food and feeding habits.

MATERIALS AND METHODS

In all 408 toads were collected from the campus of the University of Agriculture, Faisalabad. The collection of toads was started one hour after sunset and lasted, on an average, for a period of about one hour. The specimens were taken from agricultural fields, environs of buildings, road sides, and lawns and flower beds of the University campus. No specimen could be captured during the months of January and February and no collection was made during August. The contents of the stomachs of the captured specimens of a given month were pooled and preserved in 70% alcohol before being analyzed and identified. Ross (1948) was consulted for the identification of the arthropods.

Study area: The campus of the University of Agriculture, Faisalabad is located within the municipal limits of Faisalabad city. The total area of the campus comprises about 1100 acres of land and most of it is under

cultivated crops, orchards, nurseries, lawns and flower beds. The campus is irrigated with canal water through a network of irrigation ditches. In certain parts the ditches form small temporary pools which serve as suitable sites for the toad breeding. Small tanks, maintained for providing drinking water to the farm animals, are also used by the toad for breeding purposes.

RESULTS AND DISCUSSION

Foraging habits: Small round objects rolled within the field of vision of the toads usually elicited food capturing behaviour in the toad. Rolling pebbles, small pieces of wood and other objects were either caught or, at least, were followed by the toads. It was also observed that those preys which froze by arresting their movements after escaping an initial unsuccessful attack were not bothered by the toads as long as they remained immobile. The toads appeared to achieve maximum abundance near human habitations, especially those located near agricultural fields. High concentrations of the foraging toads were noted near dunghills and garbage piles. Lighted streets running across agricultural fields and gardens usually attracted a large number of insects and their predators, the toads and the little owls (*Athene brama*).

The toads were active mainly during warmer months of the year. During October and November they became scarce and from December to February they were not seen above ground.

Foods: The small-sized toads usually consumed smaller preys than those of large-sized ones. But, no attempt was made to assess the effect of size of the toad on the number and size of the prey consumed. The size of the prey eaten by the toad varied greatly. Majority of the items eaten ranged from 2 to 40 mm in size. The average size for such common food items as hymenopterans was 4.03 mm (range: 3–8 mm), for beetles 3.06 mm (range: 2–8 mm) and for the armyworms 30.4 mm (range: 25–40 mm).

Of a total of 408 stomachs examined, 304 (74.50%) contained food items. A total of 1453 food items (mainly arthropods) was obtained from these stomachs (Table 1). Thus, on the average, 3.6 food items were present in each of the stomachs examined. The number of food items per stomach was 8.8 in July, while during other months it ranged between 1.9 and 3.8. About 72% of the stomachs examined in June had food in them. Generally, during the colder months, October through December, only a small percentage of the stomachs carried food and in lesser quantities too.

As pointed out earlier, about 75% of the stomachs examined had food in them. This is an underestimate of the actual value, because the toads were collected one to two hours after sunset and thus, they had an opportunity to only a small part of the total foraging time before they were caught.

Variation in the number and species of prey in the diet of the toad was related to the seasonal changes in their abundance. Thus, high frequency of food containing stomachs in the spring and summer samples

Table 1. Monthly variations in the stomach contents of the common toad, *Bufo stomaticus*

	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
No. of stomachs examined	63.0	68.0	60.0	72.0	31.0		72.0	18.0	21.0	3.0	408.0
Stomachs with food (%)	57.2	45.6	45.0	72.2	58.1		27.8	16.7	38.1	33.3	74.5
No. of food items	185.0	240.0	203.0	226.0	273.0		271.0	7.0	41.0	7.0	1453.0
No. of food items/stomach	2.9	3.5	3.4	3.1	8.8		3.8	2.6	1.9	2.3	3.6
Rel. abundance of food items(%)											0.6
Spiders	1.1	0.8	2.0	–	–		–	–	–	–	
Millipedes	–	–	–	0.9	–		–	14.3	–	14.3	0.3
Crickets & grasshoppers	–	–	–	1.3	–		1.5	–	4.9	–	0.6
Termites	–	–	–	–	5.9		–	–	–	–	1.1
Hemipteran bugs	–	0.4	–	–	–		24.4	–	12.2	–	4.9
Ants	33.0	60.8	62.6	71.7	80.6		17.3	71.5	80.5	71.5	56.9
Beetles	13.6	28.4	4.5	25.3	13.6		56.9	14.3	2.5	14.3	24.3
Armyworms and caterpillars	41.7	2.1	29.6	0.9	–		–	–	–	–	10.0
Housefly	–	0.5	–	–	–		–	–	–	–	0.1
Snails	10.9	7.1	–	–	–		–	–	–	–	2.6
Wheat grains	–	–	3.0	–	–		–	–	–	–	0.5

was perhaps related to the abundance of the preys during these seasons. Since different prey species might have achieved maximum abundance at somewhat different times, temporal variation in the taxonomic composition and relative abundance of the prey species in the stomach was expected. Thus, such food items as the armyworms, snails and crickets were represented in the stomach samples in a few specific months only. The same is true for the hemipteran insects and spiders. Termites were taken only in the month of July. During the colder months of the study period, namely October, November and December, ants and beetles were the main staples of the diet of the toads. Thus, the variation in the diet of the toad was, at least, partly related to the seasonal variability of the food and not entirely to the selectivity exercised by the toad.

The toads mainly fed themselves on arthropods. Of the 1453 food specimens, only 37 were snails. From some stomachs a few grains of wheat were also recovered; this may be attributed to the consumption of grain–carrying ants. The arthropods were represented by four specimens of millipedes, seven of spiders and 1442 of insects. Thus, the toads mainly depended on insects for their food. Among the insects, ants were the main staples which constituted about 57% of the total food items enumerated. The highest relative frequency of these animals in the stomachs of the toads seemed to be related to their availability and their above ground crawling habits. Beetles were also consumed throughout the study period and they accounted for 24% of the stomach contents. Lepidopteran larvae, spiders and snails were consumed mainly during the spring months, whereas the millipedes, the orthopterans and the hemipterans were eaten largely during the fall and early winter.

Toads are well–known for their appetite for insect food (Berry, 1970; Clarke, 1974). Because of this propensity, they have been regarded as allies of the farmers. According to Walter and Sayles (1949) the Department of Agriculture (USA) estimated that a single individual of American common toad, *Bufo americanus* in a garden was worth dollar 17.44 as an insect destroyer. With the changed value of dollar this figure now must have increased by several folds. Frogs, like the toads, also feed voraciously on insects (Yasmin, 1982). Their role as inhibitor of insect populations in the paddy fields of India and Bangladesh has recently been proved, where large scale removal of these animals from the croplands for export purposes upset the ecological balance which led to the upsurge in the populations of pestiferous insects.

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