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FOOD AND FEEDING HABITS OF SOME REPTILES OF RAJASTHAN

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(With 3 plates)

INTRODUCTION

Many papers on Indian reptiles include some information regarding their food and feeding habits but very little is known so far concerning the reptiles of Rajasthan. Among the few papers dealing with food of reptiles in Rajasthan, mention may be made of the researches by Dave (1961), as quoted by Prakash, (1973) who considers *Uromastix hardwickii* to be herbivorous. Sunder Singh (1960) has given some information on the food of snakes of Pilani. Rathore (1969) has published a detailed account of the food and feeding habits of Indian sand skink, *Ophiomorus tridactylus*, while Prakash (1973) has concluded this lizard to be insectivorous by laboratory experiments. Prakash (1971) published a short article on *Testudo elegans* and has given a brief account of its food at Bisalpur (Jodhpur) and the same author (1972) has given some remarks on the food of a few lizards. Prakash (1973) has presented a review of the observations on the ecology and zoogeography of the reptiles of Indian desert. He states 'Most of lizards thrive upon grasshoppers, crickets, beetles, dragonflies, antlions, butterflies and termties. Spiders have also been found in *Mabuya dissimilis* vide Minton (1966).

The present paper embodies the results of studies on 3 testudines, 16 lizards and 8 species of snakes. Some observations were made in the field by the first-named author and the stomach contents have been examined, of the material preserved at the Desert Regional Station, Zoological Survey of India, Jodhpur.

The first-named author has identified the reptiles and has made the field observations mentioned in the text while the last-named author has determined the insects in the stomach contents. The name of the collector of the specimens under study, is also given.

Order TESTUDINES

Family TESTUDINIDAE

1. **Testudo elegans** Schoepff

(Indian star tortoise)

Material examined.—1 ex., Udaipur, Udaipur Dist., 9. iii. 1972; 1 ex., Forest plantation, Burr, Ajmer Dist., 10. viii, 1973; 1 ex., *ca.* 15 km. from Burr towards Ajmer (on Beawar-Ajmer Road), 11. viii. 1973. All colln. by *R. C. Sharma.*

Stomach contents.—Vegetable matter.

Remarks.— On 10. viii. 1973 at Forest plantation, Burr, the tortoise was observed for many hours feeding on grass and other vegetable matter. It passed large amount of greenish and whitish excreta twice. On examination it was found that the excretory matter contained only vegetable waste. In captivity it rejected animal food namely, the raw flesh, insects and arachnids but freely devoured the vegetables.

Family TRIONYCHIDAE

2. **Trionyx gangeticus** Cuvier

(Indian soft shell turtle)

Material examined.—1 ex., Satlana village tank *ca.* 36 km. S. of Jodhpur, Jodhpur Dist., 9. i. 1964. coll., *R. S. Pillai.* 1 ex., Surpur; *ca.* 4 km. N. W. of Dungarpur, Dungarpur Dist., 26. iii. 1964. coll. *R. N. Bhargava.*

Stomach contents.—Nothing was found.

Remarks.—This turtle is well known as omnivorous and was observed in captivity by the first-named author, feeding on aquatic weeds, plants, grasses, small fishes, earthworms, raw flesh, tadpoles, gram seeds, wheat flour, groundnuts, bread and other eatables.

3. **Lissemys punctata punctata** (Lacépède)

(Indian flap shell turtle)

Material examined.— 2 ex., Sardarsamand, Pali Dist., 7. viii. 1963, coll. *G. M. Yazdani.*

Stomach contents.—Insecta : Hymenoptera : 12 black, medium sized ants (family Formicidae). Vegetable matter : 1 plant seed; digested vegetable matter.

Remarks.—It is omnivorous and a voracious feeder and devours almost everything which is considered worth eating *e.g.*, aquatic vege-

tation, plant leaves, flowers, fruits, grasses, all kind of seeds and flesh of any kind.

Order SQUAMATA

Suborder SAURIA

Family GEKKONIDAE

4. **Stenodactylus orientalis** Blanford
(Sind sand gecko)

Material examined.— 2 exs., Agolai village, Jodhpur Dist., 21. vii. 1972; 3 exs., Balotra, Barmer Dist., 3. viii. 1973; 2 exs., Osian village, Jodhpur Dist.; 7. x. 1973. All coll. by *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : Head of longhorned grasshopper; legs of grasshopper. Lepidoptera : 1 caterpillar. Coleoptera : 2 larvae of the beetles of family Scarabaeidae; 1 unidentifiable larva; 9 ex. beetles. Hemiptera : 8 Jassids in the gut and numerous parts of the same down the gut. Diptera : 1 Asilidae. Acarina : 1 Tick. Vegetable matter : Seeds of some wild plants.

Remarks.—These nocturnal, fringe-toed lizards are abundant in many localities like Agolai, Balotra and Osian in Rajasthan, where they were observed by the first-named author running on sand dunes immediately after sunset in search of food. From July to October their food comprises mainly of longhorned grasshoppers, beetles and their larvae, lepidopterous larvae, jassids, asilids and ticks.

Minton (1966) states that they feed on termites and other soft bodied insects. Ticks and beetles now recorded in its stomach contents are hardly soft bodied. Our studies show a much larger variety of food consumption than known hitherto.

This record from Rajasthan not only confirms Minton's presumption that the species extends to western 'Rajputana' upto Kirthar Range but it also occurs quite close to Jodhpur.

5. **Cyrtodactylus scaber** (Heyden)
(Keeled rock gecko)

Material examined.— 1 ex., Mandalgarh, Bhilwara Dist., 8. iii. 1972; 5 exs., Buchetty village, Jodhpur Dist., 25. vii. 1972; 1 ex., Osian, Jodhpur Dist., 2. xii. 1972. All coll. by *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : 1 Gryllid (entire). Coleoptera : 1 ex. (1.7 mm.); elytra of beetles; mandibles of larvae (possibly of Scarabaeid beetles). Diptera : Portion of some insect. Hymenoptera : 1 ant (1.5 mm). Scorpionida : 1 Scorpion (sting and other body parts).

Remarks.—The food of this species has not been recorded earlier by any worker. The species was collected by the first-named author mostly during night.

Minton (1966) mentions that the species has been collected by him in areas of dry grassland, on rocky hill sides and in moderately sandy desert and does not often enter inhabited buildings. However the collections made above are almost under similar conditions, but in these areas it is quite acclimatized to living in inhabited houses where it may be found in company of *Gryllus* spp. hiding under stones/bricks. In the same house, other lizards such as *Hemidactylus brooki* and *Hemidactylus flaviviridis* may also be present.

Regarding range of distribution Minton (1966) includes Rajputana westwards to Egypt; except this mention (without any specific locality) there appears to be no other record from Rajasthan. The present collection from Rajasthan adds to its eastern range of distribution and observations on its food have been made for the first time.

6. **Cyrtodactylus fedtschenkoi** (Strauch)
(Turkistan rock gecko)

Material examined.—1 ex., Burr, Ajmer Dist., 9. viii. 1973; 3 exs., Sandra, Ajmer Dist., 11. viii. 1973; 5 exs., A hill near Madar T. B. Sanitorium, Madar, Ajmer Dist., 11. viii. 1973. All coll. by *R. C. Sharma.*

Stomach contents.— Insecta : Orthoptera : Legs, mandibles, abdomen of Gryllids. Coleoptera : 3 beetles belonging to 3 species of Scarabacidae and other families, 1 larva. Hymenoptera : 1 ex. ♂, Braconidae. Vegetable matter : Seeds and fibres of some wild plants. Miscellaneous : Heads and wings of 4 small insects.

Remarks.—The food of this species is being recorded for the first time. Occurrence of this species from India thus extending its eastern range of distribution from Pakistan (Baluchistan) to middle of Rajasthan.

7. **Hemidactylus triedrus** (Daudin)
(Blotched gecko)

Material examined.— 2 exs., Bhensair, Chamundia near Jodhpur, 3. viii. 1970, coll., *L. S. Rathore.*

Stomach contents.—Insecta : Coleoptera : 3 beetles (2 species) evidenced by elytra and wings. Lepidoptera : 1 pupa. Hemiptera : 1 ex. (head only). Arachnida : 1 spider.

Remarks.—Smith (1935) quotes Deraniyagala stating that termites appear to be favourite food of this species. Minton (1966) states that

stomach contents of this species indicated crickets, grasshoppers and spiders. Our observations add Coleoptera, Hemiptera and Lepidopterous pupae to the known range of its food.

8. **Hemidactylus brooki** Gray
(Spotted Indian house gecko)

Material examined.—4 exs., Bisalpur Dam, Jodhpur Dist., 17. i. 1972; 1 ex., Banswara, Banswara Dist., 18. iii. 1972; 1 ex., Achalgarh, Mt. Abu, Sirohi Dist., 21. iii. 1972; 11 exs., Hemawas Dam., Pali Dist., 28. vii. 1972; 6 exs., Kharda Dam., Pali Dist., 11. viii. 1972; 13 exs., Kharda Dam., Pali Dist., 27. ix. 1972; 1 ex., Salawas, Jodhpur Dist., 28. ix. 1972; 1 ex., Hemawas Dam, Pali Dist., 28. ix. 1972. All coll. by *R. C. Sharma*; 4 exs., Hemawas, Pali Dist., 26. vi. 1973, coll., *K. C. Kansal.*

Stomach contents.— Insecta : Orthoptera : 1 nymph, 1 grasshopper (wings, head, etc.). Coleoptera : 5 exs., belonging to Scarabeidae and other families (as evidenced by elytra, head, pronotum etc.); 1 larva and parts of other larvae. Diptera : 3 exs. (in parts). Hymenoptera : many ants. Isoptera : many examples. Dictyoptera : 1 ex. Blattidae : Wings and parts of unidentifiable insects. Arachnida : 7 spiders, whole as well as in parts. Vegetable matter : Seeds of wild plants.

Remarks— This species leads a harmonious existence with *Cyrtodactylus scaber* and *Hemidactylus flaviviridis* in most of the localities at Jodhpur and its vicinity. It has been collected from almost all parts of Rajasthan. Its range of distribution is very wide and includes Borneo, South China, to the east and upto northern half of Africa to the west. It feeds on a large variety of insects as shown above. One specimen from Achalgarh, Mt. Abu, contained a nematode in the stomach as a parasite.

9. **Hemidactylus flaviviridis** Rüppell
(Yellow bellied house gecko)

Material examined.—1 ex., Pichyak Dam, Bilara, Jodhpur Dist., 22. vii. 1971, coll. *P. D. Gupta*, 5 exs., Pantela Dam *ca.* 13 km. W. of Banswara, Banswara Dist., 15. iii. 1972; 2 exs., *ca.* 4 km. on Banswara-Ratlam Road, Banswara Dist., 18. iii. 1972; 1 ex., Kharda Dam, Pali Dist., 11. viii. 1972; 1 ex., Paota, Jodhpur, Jodhpur Dist., 29. ix. 1972; 2 exs., Osian, Jodhpur Dist. 7. viii. 1972; 1 ex. Hemawas Dam, Pali Dist., 22. xii. 1972; All colln. by *R. C. Sharma*. 2 exs., Maroth village *ca.* 13 km. N. W of Kuchaman city, 17. vii. 1973; 1 ex., Shyamgarh 10 km. E. of Maroth, Nagaur Dist., 18. vii. 1973; coll. *Y P. Sinha*, 1 ex., Forest plantation, Burr, Ajmer Dist., 10. vii. 1973; Sandera village, Ajmer Dist., 11. viii. 1973, coll., *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : 5 exs. Grasshoppers (legs, pronotum, wings etc.); 1 nymph of family Gryllidae. Lepidoptera 2 Moths (complete specimens from the foregut); 2 caterpillars of moths. Coleoptera : 17 exs., of beetles (5 species), most of them belonging to Scrabacidae and Elateridae, represented by body parts (elytra, heads, abdomen and legs etc.) of at least 5 different species. Diptera : 1 ex. Muscidae (wings, legs and thorax). Hemiptera : 5 exs., one complete ex. and others in parts (thorax, mandibles and abdomen). Hymenoptera : 1 ant. Isoptera : 36 exs. (alate cast). Miscellaneous: Chitinous portions of head, wings, and legs of unidentifiable insects; 1 insect larva with prominent curved mandibles; 1 insect pupa. Arachnida : 3 spiders (body parts).

Remarks.—The food of this most common and mainly nocturnal house lizard has been recorded recently by Minton (1966) as "various insects" The insects found in the stomach contents now are listed above. The species was found catching a centipede by the first-named author. That the species also feeds on spiders and centipedes is not surprising in view of Minton's (*l.c.*) observations that the species is pugnacious and often pursues smaller geckos of its own or other species. 4 specimens were found to contain some nematode worms as parasites in the gut/stomach.

Family AGAMIDAE

10. **Sitana ponticeriana** Cuvier
(Sargota lizard)

Material examined.—1 ex., Mewara village (near Bichewara: Dungarpur Dist., 11. iii. 1972; 4 exs., Surwania Dam, Banswara Dist.) 16. iii. 1972; 2 exs., Bajajsagar, Banswara Dist., 17. iii. 1972; 3 exs., *ca.*, 16 km. E. of Banswara, 18. iii. 1972; 1 ex., Forest Plantation, Burr, Ajmer Dist., 10. viii. 1973. All colln. by *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : 1 grasshopper (body parts). Coleoptera : 7 beetles (3-4 species) as evidenced by elytra, legs and other chitinous parts; 2 larvae. Hemiptera : 3 exs. (head and wings). Hymenoptera : 7 ants (heads and legs). Miscellaneous : 1 larva; semi-digested parts, legs and wings of unidentifiable insects. Arachnida : 1 spider.

Remarks.—The food of this agamid lizard which inhabits the moist hilly areas of central and southern Rajasthan, does not appear to have been reported earlier. Minton (1966) remarks that the species does not occur in true desert. From localities of our collection Minton's remarks stand corroborated. The species extends from Sri Lanka, South India to Pakistan (Sind only).

11. **Calotes versicolor** (Daudin)
(Indian garden lizard)

Material examined.—1 ex., Chirula village *ca.* 22 km. S. of Banswara, Banswara Dist., 16. iii. 1972; 1 ex., Satlana village, Jodhpur Dist., 3. ix. 1972. All colln. by *R. C. Sharma.*

Stomach contents.—Insecta : Lepidoptera : 1 caterpillar of a moth; 1 butterfly. Coleoptera : 4 exs. beetles (one belonging to the family Carabidae). Odonata : 1 ex. dragon fly (evidenced by wing and other body parts). Hymenoptera: 13 exs. ants. Miscellaneous : 1 insect larva, numerous insect legs. Arachnida : 1 spider.

Remarks.—This lizard is completely diurnal. Smith (1935) states that it is a very common garden lizard, which is widely distributed from Indochina to Afghanistan and feeds on insects and their larvae, spiders, etc. and that the species is also known to consume young lizards in the nest. Minton (1966) specifically mentions grasshoppers and butterflies. Prakash (1973) has stated that spiders are also found in the stomach contents of this species besides the general insect food. The above observations are largely supported with more specific mention of the insect orders taken as food.

12. **Agama agilis** Olivier
(Brilliant agama)

Material examined.—1 ex , Pichyak Dam, Jodhpur Dist., 22. vii. 1971; 1 ex Bhopalgarh, Jodhpur Dist., 27. viii. 1972; 1 ex., Osian village, 7. x. 1972; 1 ex., Osian village, 4 vii. 1973; 5 exs , Jasol village near Balotra, Barmer Dist., 4. viii. 1973, All colln. by *R. C. Sharma.*

Stomach contents.—Insecta: Orthoptera : 1 grasshopper (abdomen); Coleoptera : 6 beetles (3-4 species mostly belonging to the family Scarabaeidae, as evidenced by elytra, legs, pronotum etc), 2 larvae of the family Scarabaeidae. Hemiptera : 1 bug (body parts and head). Hymenoptera : 3 ex., (2 species) evidenced by wings and body parts; numerous ants (2 or more species). Miscellaneous : Chitinous parts such as wings, legs, head etc of unidentifiable insects.

Remarks.—The food of this diurnal lizard has been reported by Minton (1966) as crickets and grasshoppers. A much wider variety of insect food is indicated in the present studies. The species extends from Iraq and Arabia to Western Rajasthan as pointed out by Minton who has however not indicated the exact localities of Rajasthan. Plenty of nematodes and a piece of small stone was also found in the gut of some of the specimens from Jasol village near Balotra.

13. **Uromastix hardwickii** Gray
(Indian spiny tailed lizard)

Material examined.—1 ex., Sardarsamand, Pali Dist., 20. ii. 1963; 1 ex., Satlana, Jodhpur Dist., 20. x. 1963. All coll., *Motilal.*

Stomach contents.—Insecta : Coleoptera : 1 beetle (legs and elytra). Vegetable matter : grass and other vegetable matter.

Remarks.—It is well known that this species is wholly vegetarian though newly hatched lizards may also feed on insects as mentioned by Minton (1966). Field observations (of the first-named) corroborate this very well. The presence of coleopterous elytra in one of the examples appears to be accidental. In view of the present study the observations of Pradhan (1971) and Bhanotar, Bhatnagar, Srivastava and Mahto (1973) reporting the species as feeding on *Schistocerca gregaria* cannot be corroborated as its normal food under natural conditions.

Family SCINCIDAE

14 **Mabuya macularia** (Blyth)
(Bronze grass skink)

Material examined.—1 ex., Kankroli, Udaipur Dist., 24. xii. 1961; coll., *A. K. Datta*; 6 exs., Pipar City, Jodhpur Dist., 23. v. 1963, coll., *Motilal.*

Stomach contents.—Insecta : Orthoptera : 3 grasshoppers (legs and body parts). Coleoptera : 1 beetle (body parts). Hemiptera : 1 bug (badly digested body parts). Hymenoptera : 6 ants (head, down the rectum). Miscellaneous : Semi digested parts of insects. Arachnida : 1 spider (body parts).

Remarks.—The food of this nocturnal skink has not so far been reported by any worker. Prakash (1973) mentions that spiders constitute as part of the food of the related species *Mabuya dissimilis.* Our studies show that *Mabuya macularia* consumes a wide variety of insects more than the spiders. The species is widely distributed from Indo-china to Pakistan (Southern Baluchistan and Sind).

15. **Eumeces taeniolatus** (Blyth)
(Yellow bellied mole skink)

Material examined.—1 ex., Jodhpur, July 1972; 1 ex., Kharda Dam, Pali Dist., 11. viii. 1972, coll. *R. C. Sharma*; 2 exs., Jodhpur, August, 1972, coll. *R. Dheer*; 1 ex., Borunda village, Jodhpur Dist., 15. xii. 1972, coll. *R. C. Sharma.*

Stomach contents.—Insecta : Coleoptera : 2 beetles (elytra, wings,

head, legs, thorax and abdomen); 1 larva. Hymenoptera: 6 ants (1 entire, 5 heads).

Remarks.—Minton (1966) has observed that they feed poorly and spend most of their time buried and that beetle larvae seem to be their chief food. This lizard has been observed to be equally comfortable in sandy burrows and under stones in rocky habitats in Rajasthan. Besides larvae of beetles as stated by Minton (1966), adult beetles ants and other softbodied insects were found in the stomach contents. While Smith (1935) includes, 'Rajputana' as within the range of distribution by this species, Minton (1966) has omitted it. Prakash (1972) has recorded *Eumeees taeniolatus* from Rajasthan at Jhunjhunu (Sikar Dist.). He has also recorded chitinous parts of beetles from its stomach contents.

16. **Ophiomorus tridactylus** (Blyth)
(Indian sand skink, Indian sand fish)

Material examined.—1 ex., Barmer, Barmer Dist., 1969, coll., *M. S. Rathore*; 1 ex., Shergarh, Jodhpur Dist., 11. ii. 1970, coll., *S. K. Dutta*; 1 ex., Sawantgarh *ca.* 8 km. E. of Maroth, Nagaur Dist., 18. vii. 1973, coll., *Y P. Sinha*; 1 ex., Bari-Jagiwalkala village on Jodhpur-Bhopalgarh Road, Jodhpur Dist., 27. viii. 1972, coll. *R. C. Sharma.*

Stomach contents.—Insecta : Coleoptera : 1 beetle, family Buprestidae. Hemiptera : 1 bug (head). Hymenoptera : 6 ants. Miscellaneous : Legs and other body parts of insects.

Remarks.—This species was first recorded from Rajasthan by Rathore (1969), who states that termites (Isoptera) form by far the majority of its food throughout the year while beetles, butterflies, moths, crickets and grasshoppers are also consumed. Minton (1966) also mentions termites and Neuroptera (ant lions) as its food. Bhanotar, Bhatnagar and Mahto (1971) state the species to be predatory on insect eggs.

Family LACERTIDAE

17. **Acanthodactylus cantoris cantoris** Günther
(Indian fringe-toed sand lizard)

Material examined.—1 ex., Bori village *ca.* 40 km. N. of Jodhpur, 25. v. 1963, coll. *R. S. Pillai*; 1 ex., Agolai village *ca.* 46 km. W. of Jodhpur, 28. v. 1963, coll. *K. C. Kansal*; 1 ex., Salawas village *ca.* 40 km. S. W. of Jodhpur, 13. vi. 1963, coll., *R. C. Sharma*; 1 ex., Agolai village, Jodhpur Dist., 4. xi. 1966, coll. *V C. Agrawal*; 1 ex., Mathania village, Jodhpur Dist., 18. vi. 1969, coll. *G. M. Yazdani*; 1 ex., Osian,

Jodhpur Dist., 7. x. 1972, coll. *R. C. Sharma*; 1 ex., Osian, Jodhpur Dist., 4. vii. 1973, coll. *R. C. Sharma*; 1 ex., Shyamgarh, near Maroth, Nagaur Dist., 18. vii. 1973, coll. *Y P. Sinha*; 1 ex., Jasol village, Balotra, Barmer Dist., 4. viii. 1973, coll. *R. C. Sharma*; 1 ex., Bevatia village *ca.* 5 km. from Burr village, Ajmer Dist., 10. viii. 1973, coll., *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : 2 grasshoppers (legs, wings) : 1 nymph. Lepidoptera : 5 caterpillars; Coleoptera: 24 exs., belonging to Scarabaeidae, Buprestidae and Curculionidae as evidenced by elytra, legs, wings etc.; 10 larvae of family Scarabaeidae; Hemiptera : 4 exs., (1 whole and others in parts). Hymenoptera : 13 ants (complete) with numerous heads, legs. Isoptera: *Odontotermes* sp. (6 exs., soldier caste; 10 exs., worker caste; 4 exs., only parts). Neuroptera: 1 larva. Miscellaneous : legs, wings, mandibles and other chitinous parts of insects (Plate I, Figs. 1-3).

Remarks.—Minton (1966) writes that this subspecies is found in Pakistan (Sind, Punjab and Baluchistan) and that it seems to be a form of the coastal plain, desert basins and sandy plains of rivers and it avoids the mountains. It has been recently recorded from Rajasthan by Singh and Singh (1971). Bhatnagar and Bhanotar (1973) observed its general behaviour in Thar desert. The first named author has collected the specimens in the crevices of the hillocks around Jodhpur.

While nothing is known about the food of this subspecies, *blanfordi* has been recorded to feed on crickets, grasshoppers, butterflies, caterpillars, beetles and unidentified flying insects Minton (*l.c.*). Our studies on the stomach contents of an allied subspecies reveals a large variety of insects as its food.

18. **Ophisops microlepis** Blanford
(Korba snake-eyed lizard)

Material examined.—1 ex., Pipar city *ca.* 40 km. N. W of Jodhpur, 9. ix. 1961; 1 ex., Bijolai tank *ca.* 12 km. S. W of Jodhpur, 6 vi. 1963, coll. *R. C. Sharma*; 1 ex., Hemawas Dam, Pali Dist., 28. vii. 1972, coll., *R. C. Sharma*; 1 ex., Hemawas Dam, 6. iii. 1973, coll. *R. C. Sharma*; 1 ex., Barawali village *ca.* 16 km. from Jawai Dam, 25. v. 1973, coll. *Y P. Sinha*; 1 ex., Bishalpur village *ca.* 6 km. from Jawai Dam, 26. v. 1973, coll. *Y. P. Sinha*; 1 ex., Pichyak Dam, Bilara, Jodhpur Dist., 23. vi. 1973, coll. *R. C. Sharma.*

Stomach contents.—Insecta : Orthoptera : 1 grashopper. Lepidoptera : 2 caterpillars of moths. Coleoptera : 1 larva of Scarabaeidae; 1 ex., family Elateridae. Hemiptera : 2 ex., Isoptera : *Odontotermes* sp. (in one ex.) unidentified numerous workers, 10 exs., soldier caste.

Miscellaneous : 1 wing, 1 larva and other chitinous parts. Arachnida : 1 spider. Vegetable matter: some unidentified vegetable fibres (plate II, Figs. 1-5).

Remarks.—From the stomach contents it is observed that it is mainly a predator on termites though it may take other insects as well.

This species does not appear to cross the desert into Sind (Pakistan).

19. **Varanus bengalensis** (Daudin)
(Indian monitor lizard)

Material examined.—1 ex., Lalmaidan, Jodhpur, Jodhpur Dist. 6. xi. 1961, coll. *Ramreet Singh*; 1 ex., Banad village *ca.* 10 km. E. of Jodhpur, Jodhpur Dist., 1. ix. 1962, coll., *Motilal*; 1 ex., Paota, Jodhpur, Jodhpur Dist., 31. viii. 1963, coll. *R. C. Sharma*; 1 ex., Lalmaidan Jodhpur, Jodhpur Dist., 27. v. 1964, coll. *S. K. Baxi*; 1 ex., Patodi House, Paota, Jodhpur, Jodhpur Dist., 10. vii. 1967, coll. *Motilal*; 1 ex., Hemawas Dam, Pali Dist., 22. ix. 1971, coll. *P. D. Gupta*; 1 ex., Pichyak Dam, Bilara, Jodhpur Dist. 16. viii. 1972, coll. *R. C. Sharma*; 1 ex,, Vishnoi. Ki Dhani on Jodhpur-Bilara Road, Jodhpur Dist., 16. viii. 1972, coll. *R. C. Sharma*; 1 ex., Nagaur, Nagaur Dist., 21. vii. 1973, coll. *Y P. Sinha.*

Stomach contents.—Insecta : Orthoptera : 1 grasshopper. Coleoptera: 20 exs., family Tenebrionidae; 5 exs., Buprestidae; 5 exs., Scarabaeidae; 1 ex., Elateridae; 11 exs., other families (evidenced by elytra, head, thorax, legs and pronotum). Large number of legs, abdomen and other body parts of Tenebrionid and other beetles. Hymenoptera : 1 ant (large sized). Isoptera : 7 termites alate caste. Vegetable matter : Grass and other plant material (Plate I, Fig. 4).

Remarks.—This large lizard feeds mainly on beetles, ants, grasshoppers, termites and some vegetable matter as shown above. Though records are available about its feeding on small mammals, snakes and lizards but its natural food seems to be chiefly the beetles and other insects in this area between August to November. Minton (1966) mentions the following wide variety of food for this species: musk shrew, striped palm squirrel and cray-fish. Many specimens were found to be infested by nematodes.

Suborder SERPENTES
Family TYPHLOPIDAE

20. **Typhlops braminus** (Daudin)
(Brahminy blind snake, worm snake)

Material examined.—2 exs., Paota, Jodhpur, 23. vii. 1962, coll. *Modaram*; 1 ex., Public garden, Jodhpur, 15. i. 1970, coll. *Motilal*;

3 exs., Meja Dam, Bhilwara Dist., 7. iii. 1972. coll.*R. C. Sharma*, 3exs. Lalmaidan, Paota, Jodhpur, 10. vi. 1972, coll. *Y P. Sinha.*

Stomach contents.—Insecta : Hymenoptera : 2 ants. Miscellaneous : Some unidentified parts of insects. Vegetable matter : Some unidentified fibres.

Remarks.—First-named author has observed these snakes feeding in captivity, on eggs and imagoes of small ants, small caterpillars, termites, minute crickets, mosses and fungi.

Family BOIDAE

21. **Eryx johni** (Russell)
(Indian sand boa)

Material examined.—1 ex., Paota, Jodhpur, 4. vii. 1962; 1 ex., Paota, Jodhpur. 1 ix. 1962, coll., *A. K. Datta*; 1 ex., Paota, Jodhpur, 4. ix. 1963, coll. *Bhagaluram*; 1 ex., Sardarsamand, Pali Dist., 17. ix. 1968; 2 exs., Kherla village, Jodhpur Dist., 7. ix. 1971. coll., *R. C. Sharma.*

Stomach contents—Mammalia : Rodentia : Muridae. 1 ex., *Meriones* sp.

Remarks.—Minton (1966) found a young musk shrew in its stomach contents and observed it to feed on lizards and small mammals in captivity. The present study of the stomach contents supports his observations as far as small mammals are concerned.

In the field they have been collected by the first-named author from the burrows of field rats and gerbils. In captivity they were observed by him showing no liking towards lizards like *Hemidactylus flaviviridis*, *Hemidactylus brooki* and *Calotes versicolor*. They were observed by the first-named author to be feeding on young squirrel, *Funambulus pennanti*, domestic rat *Rattus* sp., domestic mice, *Mus* sp. and frog, *Rana cyanophlyctis.*

Family COLUBRIDAE

22. **Ptyas mucosus** (Linnaeus)
(Dhaman)

Material examined.—1 ex., Hemawas *ca.* 70 km. S. of Jodhpur, Pali Dist., 28. ix. 1972, coll. *Mangej Singh.*

Stomach contents.—Amphiba : Salientia : 3 exs., frogs, *Rana cyanophlyctis.*

Remarks.—There are quite a few observations on the food and the method of killing its prey by this snake Smith (1943) and Minton (1966). There is nothing to add to their observations though it may

be recorded that a large sized specimen of this species was observed chasing a field rat at speed, near Hemawas Dam, Pali District. Before the victim could enter a hole it was caught by the snake. The body of the victim was immediately coiled around and pressed strongly thus killing the rodent within a short period. Before further observations could be taken the snake escaped quickly in the dense vegetation of *Acacia* sp. with the prey in its jaws.

23. **Coluber ventromaculatus** Gray
(Glossy-bellied racer)

Material examined.—1 ex., Public garden, Jodhpur, 14. iii. 1961, coll. *Modaram*; 1 ex., Beldarpura, Jodhpur, 27. vii. 1961, coll. *Onkarsingh*; 1 ex., Arid Zone Research Farm, Jodhpur, 17.ix. 1961, coll. *I. Prakash*; 2 exs., Massoria Hills, Jodhpur, 31. v. 1962, coll., *A. K. Datta*; 1 ex., Paota, Jodhpur, 17. ix. 1969, coll. *Mangej Singh*; 1 ex., Beriganga, Jodhpur Dist., 14. iv. 1972, coll. *R. C. Sharma*.

Stomach contents.—Aves : 1 ex., young bird. Reptilia : Sauria (Lizards) : 1 ex., *Hemidactylus flaviviridis*; 1 ex., *Hemidactylus flaviviridis*; 1 ex., *Calotes versicolor*; 1 ex., *Hemidactylus brooki*; 1 ex., *Calotes versicolor*.

Remarks.—This snake is a predator on Gekkonid and Agamid lizards but occasionally it devours the young ones of small birds also. The victims are killed immediately by powerful strokes of head. The prey is pressed vigorously in powerful jaws and ultimately swallowed gradually.

This species is not known from the typically desert areas of Rajasthan and cannot be said to be a desert species. It is known from Almora and Khandesh in India, Sind and eastern Las Bela (forest) in Pakistan, Israel and Uzbekistan in U.S.S.R.

Besides the stomach contents mentioned above, on 29 July, 1972, the first-named author observed a large snake with young one of a bird in mouth at Central Arid Zone Research Institute, Pali. Minton (1966) found bats, musk shrew, lizards namely *Hemidactylus flaviviridis* and *Acanthodactylus* sp. in the stomach of these snakes and also observed them feeding on other species of lizards except skinks.

24. **Sphalerosophis diadema diadema** (Schlegel)
(Rajatbansi)

Material examined.—1 ex., Baildarpura, Jodhpur, 20. viii. 1961, coll. *Onkarsingh*; 1 ex., Paota, Jodhpur, 21. ii. 1963, coll. *R. N. Bhargava*; 1 ex., Gangani village, Jodhpur Dist., 24. iii. 1963. coll. *S. K. Baxi*; 1 ex., Paota, Jodhpur, 8. iv. 1965, coll. *R. N. Bhargava*; 1 ex., Paota,

Jodhpur, 16. viii. 1965, coll. *V C. Agrwal*; 1 ex; Jajiwal-Kala *ca.* 28 km. E. of Jodhpur, 27. viii. 1972, coll. *R. C. Sharma*; 1 ex., Arnaji *ca.* 20 km. W. of Jodhpur, Jodhpur Dist., 21. ix. 1972, coll. *R. C. Sharma*; 1 ex., Military petrol Depot, Jodhpur, 15. iii. 1973, coll. *R. C. Sharma.*

Stomach contents.—Mammalia : Rodentia : Muridae, 1 ex., *Tatera* sp.; 1 ex., *Tatera indica*; Sciuridae, 1 ex., squirrel (evidenced by tail).

Remarks.—This species is already known to feed upon rats, mice, and squirrels (Wall, 1913; Smith, 1943 and Minton, 1966). These large snakes were found in the agriculture fields going from one burrow to the other, obviously in search of field rats, gerbils and field mice. The study of the gut contents as shown above establishes that the food of this snake is probably the Indian gerbil, *Tatera indica* an important rodent pest of agriculture in Rajasthan (Plate III. Fig. 3). The snake has also been observed on one occasion climbing up a tree and chasing squirrels *Funambulus pennanti*, in the vicinity of Beriganga, Jodhpur. It has been further observed that in captivity these snakes show no liking towards frogs, toads and lizards.

25. **Xenochrophis piscater** (Schneider)
(Checkered keelback)

Material examined.—1 ex., Gapesagar, Daungarpur, 23. iii. 1964, coll. *R. N. Bhargava*; Surpur Kinadi *ca.* 4 km., N. W of Dungarpur, 26. iii. 1964, coll. *R. N. Bhargava*; 1 ex., Sardarsamand, Pali Dist., 13. xii. 1967. coll. *P. D. Gupta*; 1 ex., Sardarsamand. Pali Dist., 17. ix. 1968. coll., *D. S. Mathur*; 1 ex., Hemawas Dam, Pali Dist., 16. vii. 1971, coll. *R. C. Sharma*; 2 exs., Pichyak Dam, Jodhpur Dist., 22. x. 1971, coll. *P. D. Gupta*; 1 ex., Meja Dam, Bhilwara Dist., 7. iii. 1972, coll. *P. D. Gupta*; 3 exs; Udaipur, 9. iii. 1972, coll. *P. D. Gupta*; 2 exs., Gapesagar, Dungarpur, 12. iii. 1972, coll. *P. D. Gupta*; 1 exs., Sardarsamand, Pali Dist., 19. vi. 1972; 1 exs., Jawai Dam, Pali Dist., 23. v. 1973, coll., *Y P. Sinha.*

Stomach contents.—Amphibia : Salientia : 1 ex., *Rana cyanophlyctis*, 2 exs., *Rana* sp. Pisces : Cyprinidae : 1 ex., *Puntius* sp. (Plate III, Fig. 1).

Remarks.—This species is well known for feeding on fishes and other aquatic fauna excluding insects Minton (1966).

26. **Boiga trigonata** (Schneider)
(Indian cat snake)

Material examined.—1 ex., Prithvipura, Jodhpur, 30. viii. 1961, coll. *Onkarsingh*; 1 ex., Paota, Jodhpur, 26. vi. 1963, coll. *Motilal*; 1 ex.,

Paota, Jodhpur, 13. v. 1964, coll. *V C. Agrawal*; 1 ex., Paota, Jodhpur 3. viii. 1965, coll. *R. N. Bhargava*; 1 ex., Paota, Jodhpur, 9. viii. 1965, coll. *R. N. Bhargava*; 1 ex., Paota, Jodhpur, 1. viii. 1967, coll. *Motilal*; 1 ex., Lalmaidan, Paota, Jodhpur, 25. iii. 1968, coll. *Laxman Singh*; 1 ex., Satlana village, Jodhpur Dist., 3. ix. 1972, coll. *R. C. Sharma*; 1 ex., Polo, Jodhpur, 15. ix. 1974, coll. *N. S. Rathore*.

Stomach contents.—Aves : 1 ex., house sparrow. Reptilia : 2 exs., *Calotes versicolor* (Plate III, Fig. 2).

Remarks.—This species is already known for feeding on lizards of the genera *Calotes* and *Acanthodactylus* and to devour small birds Minton (1966). Our observations also confirm the above food habits of this snake. There is no specific record of this species from Rajasthan, either by Smith (1943) or by Minton (*l.c.*)

Family VIPERIDAE

27. **Echis carinatus** (Schneider)
(Saw scaled viper)

Material examined.—1 ex., Paota, Jodhpur, 26. x. 1961, coll. *Ghisuram*; 2 exs., Salawas village, Jodhpur Dist., 7. ix. 1962, coll. *A. K. Datta*; 1 ex., Paota, Jodhpur, 23. viii. 1965, coll. *P. D. Gupta*; 1 ex., Narva village, Jodhpur Dist., 12. viii. 1969, coll. *P. D. Gupta*; 3 exs., Central Arid Zone Research Farm, Pali, 30. vii. 1971, coll. *R. C. Sharma*; 1 ex., Kharda Dam, Pali Dist., 11. viii. 1972, coll. *P. D. Gupta*; 2 exs., Mandalgarh *ca.* 48 km. S. W of Bhilwara, 8. iii. 1972, coll. *R. C. Sharma*; 1 ex., Kharda Dam, Pali Dist., 28. vii. 1972, coll. *R. C. Sharma*; 3 exs., Central Arid Zone Research Farm, Pali 29. vii. 1972, coll. *R. C. Sharma*; 1 ex., Khajerla village, Jodhpur Dist., 5. viii. 1972, coll. *R. C. Sharma*; 4 exs., Kharda Dam, Pali Dist., 11. viii. 1972, coll. *R. C. Sharma*; 1 ex., Kaparda village, Jodhpur Dist., 16. viii. 1972, coll. *R. C. Sharma*; 1 ex., Bari Jagiwal Kala *ca.* 28 km. E. of Jodhpur, 27. viii. 1972, coll. *R. C. Sharma*; 1 ex., Kharda Dam, Pali Dist., 27. ix. 1972, coll. *R. C. Sharma*; 1 ex., Hemawas Dam, Pali Dist., 28. ix. 1972, coll. *R. C. Sharma*.

Stomach contents.—Insecta : Orthoptera : 1 ex., *Schistocerca gregaria, Poekilocerus pictus*. Arachnida : 1 ex., Scorpion; 2 exs., Spider; 1 ex., solifugid. Myriapoda : Chilopoda : 1 ex., *Scolopendra* sp. nr. *morsitans*. Amphibia : Salientia : 1 ex., *Rana cyanophlyctis*; 2 toads. Reptilia : Sauria : 1 ex., *Hemidactylus brooki*. Serpentes : 1 worm snake, *Typhlops braminus*.

Remarks.—This species is also known to feed on a wide variety of food Minton (1966). Our studies merely confirm his long list of preys of this snake.

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SUMMARY

The food and feeding habits of 27 species of reptiles have been discussed in this paper on the basis of field observations as well as on the basis of gut contents study.

1. The food of the following species has been recorded for the first time :

Cyrtodactylus scaber, Cyrtodactylus fedtschenkoi, Sitana ponticeriana, Mabuya macularia, Acanthodactylus cantoris cantoris and *Ophisops microlepis.*

2. The following species are being reported from Rajsthan for the first time :

Stenodactylus orientalis, Cyrtodactylus scaber, Cyrtodactylus fedtschenkoi, Sitana ponticeriana, Agama agilis, Coluber ventromaculatus and *Boiga trigonata.*

3. Our studies reveal a larger variety of insects as food, than known hitherto in the following species:

Stenodactylus orientalis, Hemidactylus triedrus, Hemidactylus flaviviridis, Calotes versicolor, Agama agilis, Eumeces taeniolatus, Ophiomorus tridactylus, Varanus bengalensis and *Typhlops braminus.*

4. The following species feed exclusively on vegetable matter : A *Testudines, Testudo elegans* and a lizard *Uromastix hardwickii.*

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