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A NEW SPECIES OF *PHRYNOCEPHALUS* KAUP (REPTILIA : AGAMIDAE) FROM THE RAJASTHAN DESERT, INDIA WITH NOTES ON ITS ECOLOGY

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ABSTRACT

Phrynocephalus laungwalaensis, a new species of lizard belonging to the family Agamidae, inhabiting the barren sand-dunes in Laungwala, Sam village and Lunar village, Jaisalmer District, Rajasthan, India, is described. It is diurnal in habit and has the capacity to bury itself upto a depth of *Ca.* 30 cm. in the loose sand by vigorous wriggling movements of the body, limb and the tail.

INTRODUCTION

While surveying Jaisalmer district of Rajasthan during 1975-1977, numerous examples of a new saltatorial agamid lizard of genus *Phrynocephalus* Kaup (1825), were found to inhabit the various sand-dune localities near Laungwala, Sam and Lunar. According to Smith (1935) and Minton (1966) the genus already includes 40 species, out of which five, namely, *P. scutellatus* (Olivier), *P. leuteoguttatus* Boulenger, *P. ornatus* Boulenger, *P. maculatus* Anderson and *P. euptilopus* Alcock and Finn occur in Pakistan, while the remaining 35 are restricted to Western and Central Asia.

Phrynocephalus laungwalansis, n. sp.
(Pls. III & IV)

Material examined (*R. C. Sharma* coll.) : 1 adult ♂, Laungwala, Alt. 149·96 m. ; lat. 26°46′N ; long. 70°13′E, 10. x. 1975. (ii) 2♂♂, 1 ♀, Sam village, Alt. 176·78 m. ; lat. 26°50′N ; long. 70°30′E, 5. v. 1976. (iii) 5♂♂, 1 ♀, Lunar village (near Dhanana), Alt. 139.29 m. ; lat. 26°35′ ; long. 70°10′E, 17. iv. 1976.

DESCRIPTION

Dorsum dark greyish and thickly speckeled with black ; black spots on the back arranged in more or less longitudinal rows ; chin, neck, shoulders, dorsal aspect of tail, upper surface of limbs, gular region, and dorsal and lateral aspects of head liberally spotted with black ; the complete ventrum whitish. All examples from the sand-dunes of Sam village possessed two blue spots on ventral aspect, slightly below the neck.

Body long, stout, flattened dorso-ventrally and with a prominent lateral fold. Head roughly oval and quite distinct from neck ; snout vertical, comparatively more acute than in other allied species of the genus ; nasal shields not in contact with one another,

separated by a vertical row of 1-3 scales ; nostrils directed vertically upward and forward, nasal region much bulged ; supraorbital ridge prominent and composed of strongly keeled scales ; eyes small, pupil round, eyelids with acute, fringed scales ; gular fold most distinct ; head region with mixed smaller and larger scales which are largest and grouped together on the parietal region (roughly on the middle of head) ; right supralabials 16, left 17 ; right infralabials 16, left 16 ; sides of back of head and of neck with long spinous tubercles ; dorsal scales subequal, imbricate and bearing spinous tubercles or keels ; scales on flanks just like the dorsal scales ; gular scales strongly keeled and bear a spine-shaped posterior tip ; two rows of enlarged scales parallel to the infralabials not separated from one another by smaller ones ; mental shield large, almost two times larger than the adjacent labials ; limbs long and stout, the hind-limbs reaching the eyes ; digits long, with keeled spinous lamellae beneath and with lateral spinous denticulations whose length is not more than the breadth of the digit ; a strong postanal fold in all examples. Tail shorter than head and-body, swollen and compressed dorsoventrally at its base, becoming slender and round posteriorly and ultimately tapering into a bluntly pointed tip ; covered above with large, strongly keeled, spinose scales intermixed with a few smaller ones.

Measurements : Snout to vent, length ♂♂ 29-69 mm., ♀♀ 31-54 mm. ; tail length ♂♂ 15-42 mm., ♀♀ 18-32 mm. ; axilla to groin distance ♂♂ 12-37 mm. ; ♀♀ 13-15 mm. ; head-width ♂♂ 8-18 mm. ; ♀♀ 9-14 mm. ; head-length ♂♂ 10-23 mm., ♀♀ 10-16 mm. ; girth at the mid-body ♂♂ 25-54 mm., ♀♀ 27-47 mm.

Type-specimens ; *Holotype* : ♂ adult, *vide* "material" (i) above, Z. S. I. Reg. No. 23452, deposited in National Zoological Collections, Zoological Survey of India, Calcutta. *Paratypes* : 7 ♂♂ and 2 ♀♀ *vide* "materials" (ii) and (iii) above, Z. S. I. Reg. No. 23453-23461, also in Z. S. I., Calcutta.

Type-locality and distribution : INDIA : Type-locality : Sand-dunes near Laungwala. Distribution—the type-locality : Sam (*c.* 40 km. W. of Jaisalmer) and Lunar village, Jaisalmer District, Rajasthan.

Comparison : *Phrynocephalus laungwalaensis* sp. n. comes close to *P. euptilopus* Alcock and Finn, but differs from it as follows : 1. Body longer. 2. Snout acute (*vs.* blunt). 3. Nasal shields not in contact with one another, separated by a row of scales (*vs.* in contact with one another). 4. Nostrils directed vertically upwards and forward, the region much bulged (*vs.* directed more or less straight forward). 5. Supraorbital ridge most prominent and projected (*vs.* less projected and prominent). 6. Gular fold most distinct (*vs.* feebly developed). 7. Gular scales strongly keeled (*vs.* smooth). 8. Ventral scales feebly keeled (*vs.* smooth, mucronate). 9. Two rows of enlarged scales, parallel with infralabials, not separated from one another by smaller ones (*vs.* separated from one another by smaller scales). 10. Mental scales large, almost two times larger than the adjacent labials (*vs.* very small, not larger than the adjacent labials). 11. Digits with keeled, spinous lamellae beneath (*vs.* with smooth or feebly keeled lamellae beneath). 12. Digits with smaller lateral spinous denticulations beneath, whose length not greater than the breadth of the digit (*vs.* digits with well-developed lateral denticulations, whose length being greater than the breadth of the digit). 13. A strong post-anal fold present (*vs.* feebly developed). 14. Tail shorter than head-and-body, covered with large, keeled, spinous scales which are intermixed with few smaller ones (*vs.* tail always longer than the head-and-body, covered with subequal moderately keeled scales).

ECOLOGICAL NOTES

P. laungwalaensis sp. n. inhabits the most western sandy desert parts of Jaisalmer district where the dry almost barren, vegetation-less, 5-20 metres high, shifting type of sand-dunes prevail. Scarcity of water, intense heat and wind erosion hazards add severe constraints on plant animal life and on human beings. The dunes are composed of loose sand of a light brown to whitish-yellow colour. In between the dunes, patches of gravel make a marked feature. The inter-dunal spaces, which run for miles, are covered with dense, xerophytic vegetation, comprising mainly the small to medium herbs, shrubs and trees, like *Acacia senegal*, *A. jaquemontia*, *Prosopis spicigera*, *Acacia juliflora*, *Erianthus munja*, *Tacoma undulata*, *Euphorbia neriifolia*, *Commiphora mukul*, *Salvadora cleoides*, *Aerua tomentosa*, *Calligonum polygonoides*, *Capparis aphylla*, *Crotolaria burhis*, *Leptodesmia sparticum* and *Lycium barbatum*, etc. Such inter-dunal spaces provide a favourable zone for various animals for shelter and food. Innumerable burrows of rodents, lizards and insects represent a characteristic feature of these spaces. Among the various species which were noticed in the runnels of such inter-dunal spaces are : two species of rodents, two species of lizards (*Agama agilis* and *Acanthodactylus cantoris*), and various orthopterans and beetles. *Phrynocephalus laungwalaensis* does not dwell in this inter-dunal zone of vegetation but lives considerably above, on barren sand-dunes. It does not make burrows and is diurnal in habit.

During March to June these lizards were found to be most active during morning upto 11 A. M. Activities were also noticed during the afternoon after 4 P. M., but movements were slower. During noon, either they remained under the cover of sand or the activities were quite slow. They were capable of running extremely fast over loose sand, and even while climbing the steep elevations of the sand-dunes the speed was kept up. The lizards are capable of burying themselves in loose sand by vigorous, wriggling movements of the body, limbs and the tail, and on many occasions they were found concealed up to a depth of *c.* 30 cm. The spinous lamellae beneath and the lateral spinous denticulations on the toes help them a great deal in going under the cover of loose sand, barely in 3 to 4 seconds. Their capability of closing the nostrils and a built in sand trap in their nose help them to breathe under the sand without suffocation. Their strongly projecting and fringed scaly eyelids are most suited for their fossorial—saltatorial habits, and when closed do not permit sand to enter their eyes. It was interesting to observe that when the lizards are disturbed they immediately sink into loose sand up to 3 or 4 cm., leaving a clear trail on the sand. Many lizards were caught easily with the help of a long forcep by inserting it quickly on both the sides of this trail. If the lizard is not caught in the first attempt, it sinks deeper into the sand and escapes. A few lizards were noticed in the open when the wind velocity was too high, but otherwise they were seen in considerable numbers on the edges of the sand-dunes in the morning up to 10.30 A. M. and after 4 P. M. in the afternoon during May.

Food and feeding : The food, as evidenced by the stomach contents, comprises mainly of small red ants (*Monomorium aberrans*, family Formicidae), which are found in abundance on sand-dunes the year round. The food also includes large black ants ; various hymenopterous insects (families Apidae and Braconidae) ; many species of small beetles (family Scarabaeidae) ; various orthopterous insects like *Chrotogonus* sp. and *Schizodactylus* sp., and grubs of beetles. The optimum feeding of these lizards was noticed at about 10.30 A. M.

TABLE 1. Related climatic factors effecting the life of *Phrynocephalus laungwalaensis* (Range is given for the complete month of May, 1976)

TEMPERATURE								RELATIVE HUMIDITY (%)		WIND VELOCITY [For 24 hrs, averaged for the whole month] KMPH
AIR		SOIL								
		Morning			Evening					
Maximum	Minimum	5 cm depth	15 cm depth	30 cm depth	5cm depth	15 cm depth	30cm depth	Morning	Evening	
39.2°—45.8°c	22.8°—30.5°c	23.0°-34.0°c	31.0°-37.4°c	29.5°-38.7°	49.6°-57.2°c	36.0°-40.5°c	29.5°-38.8°c	53% to 92%	10% t 48%	12 6-28.1

On many occasions it was observed at Sam village that the lizards are capable of capturing grass-hoppers (*Chrotogonus* sp.) and other insects with a marked accuracy even at the time of high wind velocity. They thrust their snout into the burrows of the hoppers and catch the victims without giving them a chance to escape. On seeing an insects within their reach, they lie motionless and then suddenly grab insect with surprising agility.

Related climatic factors : The main factors which influence the life of these diurnal lizards in such a difficult habitat are temperature, humidity and velocity (Table 1.).

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