

## PRELIMINARY OBSERVATIONS AND COMMENTS ON SYNTOPIC OCCURRENCE OF LIZARDS IN IRAN

Steven C. Anderson<sup>1</sup>

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Relatively little is known about the ecology of lizards in Iran. This paper serves as a brief introduction to five representative biotopes and their associated lizard species living syntopically, based largely on my own observations. The selected localities are found in 1) Masjed Soleyman, foothills of the Zagros Mountains, Khuzestan; 2) Kupal dunes, on the Mesopotamian Plain, Khuzestan; 3) Shah 'Abbas Caravanserai, Dasht-e Kavir, on the Central Plateau; 4) an abandoned village in Sistan, ruined buildings and loose loess substrate; 5) Hyrcanian Forest, northern slopes of lower Alborz Mountains and the Gorgan region. The biotopes are characterized briefly and the concept of syntopy is discussed.

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Apart from the casual observations recorded by zoological collectors, little is known of the natural history and ecology of Iranian lizards, as no field studies comparable to those made elsewhere in the world have been undertaken for Iran.

Nonetheless, aspects of diet, reproduction, and adaptation to the environment can be ascertained by examination of preserved material, although most of this information is nonquantitative and must be regarded as preliminary, pointing the way to future studies. The systematic studies which have been carried out on this fauna allow us to form some biogeographic hypotheses and also enable us to make some preliminary statements about community structure.

This paper focuses on syntopic occurrence of lizard species in selected biotopes.

The necessary first step in describing animal communities is to identify the species that have the potential to interact. Sympatry is the term used for the overlapping distributional ranges of two or more species and can be determined in an armchair fashion by comparing distribution maps. This is useful for interpreting historical biogeography, but tells us little about the makeup of biotic communities. Syntopy refers to species living together in the same or adjacent biotopes where they have the opportunity to interact in some ecologically meaningful way, such as sharing and competing for the same resources, or through

predator/prey relationships, etc., i.e., in some way constraining the fundamental niches of one another.

Much of the pioneering work in defining lizard communities has been done by Pianka and his co-workers (see especially Pianka, 1986 for a review). A study not only of species diversity, but relative abundance, resource partitioning in time and space, microhabitats, etc., is necessary to begin to understand the structure of lizard communities. Further, one must also consider other animals which may compete with, prey on, and serve as food for lizards. These include insectivorous birds and large arthropods, such as scorpions, solpugids, and hunting spiders among potential competitors.

At this point it is possible only to make a bare beginning at describing syntopy among Iranian lizards. While the most abundant diurnal species in a particular biotope can usually be identified in a short period, the rarest species may go undetected even after intensive investigation. I lived in Masjed Soleyman in Khuzestan for nine months without personally encountering all lizard species known from that general area. Here I will attempt to enumerate syntopic species for only a few of the best-collected biotopes from representative geomorphological provinces, with the expectation that these lists will be extended with future investigations.

### Masjed Soleyman

The herpetofauna of this region was reported by Anderson (1963). Collecting was done over a nine-month period in this area in the foothills of the Zagros

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<sup>1</sup> Department of Biological Sciences, University of the Pacific, Stockton, CA 95211, USA, and Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA. E-mail: asaccus@aol.com

Mountains in Khuzestan Province in 1958. Details of the geography of this region were provided by Anderson (1963:417–419, Fig. 1), but in brief, the foothill environment is set in a series of anticlinal hills and synclinal valleys from 150–1500 m. The formations are limestones, marls, and gypsum, the principal substrates of the biotope are alluvial fill in the valleys and exposed limestone outcrops on the hillsides. Early rains begin in November, March usually being the end of the rainy season. Spring temperatures are mild, but summer temperatures become increasingly high, with little nighttime cooling. Substrate temperatures exceed 50°C before midday in summer and remain high until late in the afternoon. The vegetation has been much degraded by human activities and is characterized by little woody vegetation, other than occasional thorny shrubs and widely scattered small trees. All arable land is under cultivation for wheat and barley during the winter and spring, barren the rest of the year. Annual herbaceous plants of a Mediterranean character proliferate in the cultivated fields and along seasonal water courses during the spring. The lizards which occur syntopically throughout this widespread biotope are: *Laudakia nupta nupta*, *Trapelus agilis*, *Eublepharis angramainyu*, *Asaccus elisae*, *Cyrtopodion scabrum*, *Hemidactylus persicus*, *Tropicolotes helenae helenae*, *T. persicus bakhtiari*, *Mesalina watsonana*, *Mabuya aurata septemtaeniata*, and *Varanus griseus*. *Uromastyx loricatus* occurs locally at low elevations. In addition, *Ophisops elegans* may occur syntopically with some of these species in some localities. Thus, the lizard community of this biotope consists of 11–12 species at any one locality, *Laudakia*, *Trapelus*, and *Mesalina* the most abundant diurnal species. Half of the species are nocturnal.

### Kupal Dunes

This area was visited twice, once in 1958 and once in 1975. It is an area of active, wind-blown sand dunes 1 km east of Kupal along the Ahvaz-Behbahan road at 31°16' N, 49°10' E, 25–50 m elevation. It is representative of a biotope locally developed at several places on the Ahvaz plains of Khuzestan. A few shrubs grow on the dunes and on the sandy fringes; some grasses and thorny shrubs are found in the “blow-out” depressions. The climate is Mediterranean, with winter rains, subtropical, hot, and arid. Lizard species occurring syntopically here: *Trapelus persicus*, *Bunopus tuberculatus*, *Stenodactylus dorrae*, *Acanthodactylus schmidtii*, *Scincus scincus conirostris*, and *Varanus griseus*. The amphisbaenid,

*Diplometopon zarudnyi*, also occurs here. *Phrynocephalus arabicus* and *Stenodactylus affinis* have been collected 21 km north of Ahvaz, and might be expected to occur in the Kupal dunes, as well. The only other sand-adapted lizard known for the Ahvaz Plain is *Acanthodactylus grandis*; these were abundant in a more stabilized sandy area near Bushire.

### Shah ‘Abbas Caravanserai

The Shah ‘Abbas Caravanserai, 34°44' N, 52°10' E, about 1000 m elevation, near the foot of Siah Kuh, has served as a headquarters for biological field investigations of the fauna of the Kavir Protected Region. It is located on the Central Plateau in Tehran Province. I collected here 13 June 1975 and examined specimens brought to the museum in Tehran (MMTT) by other zoologists over several years. The substrate here is dry, gravelly alluvium on flats and slopes, the vegetation shrubby steppe (dominated by *Artemisia herba-alba*). Elsewhere, within the near vicinity are other surfaces, sandy or salty to various degrees (see Nilson and Andrén, 1981 for a more detailed description of this region). I collected only two species of lizards during my brief visit, *Trapelus agilis* and *Agamura persica*, but the following are also known from this biotope in or near this locality: *Phrynocephalus scutellatus*, *P. maculatus*, *Uromastyx asmussi*, *Eremias andersoni*, *E. persicus*, *Mesalina watsonana*, *Ophiomorus nuchalis*, and *Varanus griseus caspius* (see also Nilson and Andrén, 1981). Not all of these species may be present on all substrates, *Phrynocephalus maculatus* and *Eremias andersoni* preferring sandy surfaces, and *P. scutellatus* tolerating saltier soils than most other lizard species.

### Abandoned Village in Sistan

At various locations on the flat alluvial plain in Sistan, there are abandoned villages swamped in fine-grained eolian loess deposits. Vegetation around the village consisted of scanty shrubs, probably *Salsola* sp., although some wet-rice cultivation was carried out at the edge of the village. In addition to the drifts of loose material, this biotope consists of the inner and outer walls of the mud-brick buildings, some of these surfaces still covered with plaster. I collected at one such locality at 31°03' N, 61°38' E, 450 m elevation on 27–28 April, 1975. The following species are syntopic at this locality: *Trapelus agilis*, *Bunopus tuberculatus*, *Cyrtopodion longipes*, *Teratoscincus bedriagae*, *T. microlepis*, *T. scincus keyserlingii*, *Ophiomorus tridactylus*, *Eremias acutirostris*, *E. lineolata*. In addition to these nine species all living in

close proximity to one another (within about 50 m linear distance), *Phrynocephalus maculatus maculatus* was collected on the flat plains nearby. Particularly noteworthy is the occurrence of all three species of *Teratoscincus* living syntopically (Anderson, 1993).

### Hyrceanian Forest

I collected in the broadleaf forest 26 km south of Amol on the road to Tehran, 36°17' N, 52°21' E, 450 m elevation on 28 May 1975, in Mohammad Reza Shah National Park at two localities on 30 May 1975, 37°21' N, 56°01' E, 450 m elevation and 37°21' N, 56°12' E, 800 m elevation, and at 39 km south of Chalus on the road to Karaj, 36°19' N, 51°16' E, 600 m elevation, on 20 June 1975, all in Mazanderan Province.

The Hyrcanian forest is a relic of the temperate, broad-leaved deciduous forest that covered large parts of Europe and northern Asia during the late Tertiary. It is characterized by vigorous growth, tall trees and several-storied structure, lianas, regenerative capacity, and tree and shrub species diversity. This forest is much degraded, and largely destroyed in the lowland. The whole forest area receives about 800 to 2000 mm precipitation. The maximum comes in autumn, but no season is without rain (Bobek, 1968).

Only *Anguis fragilis*, *Ophisaurus apodus*, *Lacerta chlorogaster*, *L. steineri* and *L. strigata* are known to be syntopic in this forest biotope.

Without wishing to belabor the obvious, I want to point out that syntopic occurrence presents us with a

hypothesis of some importance. This is that the fundamental niche of any one species in a lizard community is constrained by the presence of other members of this community. This is based on the notion that the realized niche is determined by resource partitioning through competition and predation. However, in practice it is extremely difficult to test this hypothesis. Comparing the autecology of a species as a component of two or more lizard communities of differing composition can raise suggestive questions, but does not test the hypothesis, since the resource matrix is bound to differ amongst the communities studied. Removal/exclusion/replacement manipulation of communities might provide a test of the hypothesis, but such experiments are difficult in lizard communities. Pianka (1986:75 – 90) discussed theoretical and practical aspects of this problem and reviewed the literature.

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