Table 4: Measurements made on juvenile Vipera kindii born in captivity and fed on small frogs and fish during the first 4 months.

<table>
<thead>
<tr>
<th>G.N.M. Re. ex.</th>
<th>Weight (gram)</th>
<th>Total length (mm) 8.V.1974</th>
<th>Total length (mm) 10.IX.1974</th>
</tr>
</thead>
<tbody>
<tr>
<td>4355 (a)</td>
<td>1.49</td>
<td>102</td>
<td>121</td>
</tr>
<tr>
<td>4355 (b)</td>
<td>1.50</td>
<td>105</td>
<td>124</td>
</tr>
<tr>
<td>4355 (c)</td>
<td>1.64</td>
<td>109</td>
<td>126</td>
</tr>
</tbody>
</table>

OBSERVATIONS ON THE HERPETOFAUNA OF TURKEY IN 1968-1973

By

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(Received 1/5/75)

INTRODUCTION

The data are based on field observations in the European part of Turkey, Thrace, and the western parts of Asian Turkey, Anatolia, made during five different excursions in 1968-1973. All specimens were caught and examined in the field. All species were documented with photographs. A minor part of the collection is preserved in the Natural History Museum of Gothenburg (G.N.M.) and in the Department of Zoology, University of Gothenburg (D.Z.G.). The major part of the 1968 collection of reptiles and amphibians returned to Sweden by air, unfortunately disappeared on the way and was never found.

<table>
<thead>
<tr>
<th>Periods of observation</th>
<th>Areas of observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>28/05-25/06 1968</td>
<td>Western Anatolia and Thrace</td>
</tr>
<tr>
<td>17/06-23/07 1970</td>
<td>Western Anatolia and Thrace</td>
</tr>
<tr>
<td>28/12-02/01 1971-72</td>
<td>Province Mugla</td>
</tr>
<tr>
<td>08/04-20/04 1972</td>
<td>Provinces Mugla and Anatolia</td>
</tr>
<tr>
<td>01/08-03/08 1973</td>
<td>Trace (Belgrad Forest)</td>
</tr>
</tbody>
</table>

VEGETATION OF THE AREA

Northern Thrace, situated north of the Marmara Lake, is an offshoot from the European broad-leaved forest. The vegetation is montane summer-grown forest. Southern Thrace and western Anatolia are a part of the Mediterranean sclerophyll-vegetation area. The lowland formerly embraced forest dominated by Quercus coccifera and Pinus halipensis, but after repeated treefelling the ecology of the forest has changed dramatically, resulting in the loss of forest, and only shrub vegetation remains. In slightly damp areas the dense shrub forest includes Quercus coccifera, Erica arborea, Myrtus communis intertwined by trailing plants. This vegetation, the maccia, is replaced by the phrygana in dryer areas, which is characterized by low, thorny bushes (especially species of Leguminosae), grasses and many aromatic herbs (Lavendula, Stureja, Salvia, Asphodelus, Myrtus and Stachys). In the southern and central parts of Anatolia, there are smaller areas of semi desert and desert steppe. In ground depressions, which are influenced by saline groundwater, there is salt steppe vegetation characterized by Artemisia and the family Chenopodiaceae (Chenopodium, Salsola). The dominating type of soil is the red, ferruginous terra rossa. The entire area has dry, warm summers and mild rainy winters.
HERPETOFAUNA OF THE AREAS VISITED
All specimens mentioned were adults, except for the occasional juveniles (remarked).

SALENTIA

Bufo bufo spinosus Daudin
Boz Dagh, east of Izmir near Ondemis. 27.VI.1972 (3).

Bufo viridis viridis Laurenti (fig. 1).
Uria near Izmir, 7 VI.1968 (1).
Boz Dagh, east of Izmir near Ondemis. 2 VI.1968 (1).
Bafa Lake, Province Aydin. 25.VI.1970 (7).
Boz Dagh, east of Izmir near Ondemis. 27.VI.1970 (1).

Rather common in the lowland areas and in the mountains. Most specimens in the Ciglicara Forest in amplexus at the bottom of a pond, about 20 cm deep.

Hyla arborea arborea Linnaeus

Specimens seen in April in Marmaris, sitting on the ground, at the borders of small ponds, calling. Those seen in July in the Manyas Lake area sitting on reeds (Phragmites communis) one metre above ground.

Rana delmatinge Bonaparte
Belgrad Forest, north of Istanbul. 13.VII.1970 (1).

Single specimen found in area characterized by montane summerrgreen forest.

Rana ridibunda ridibunda Pallas
Belgrad Forest, north of Istanbul. 13.VII.1968 (1).
Belgrad Forest, north of Istanbul. 20.VII.1970 (10).

An extremely common species, noticed in almost every pond, lake and stream; often in great numbers.

CHELONIA

Clemmys caspica rivulata Valenciennes
Halkali near Istanbul. 30.V.1968 (10 specimens).
Belgrad Forest, north of Istanbul. 20.VII.1970 (7).

Testudo graeca iberia Pallas (fig. 2)
Halkali near Istanbul. 30.V.1968 (1).
Foca near Izmir. 3.VI.1968 (1).
Efesus, south of Izmir. 2.VII.1970 (10).
Belgrad Forest, north of Istanbul. 20.VII.1970 (10).
A female *Testudo graeca iberica* was observed at noon during egglaying on the 13.VI.1968 a few kilometres north of the village Boz Dagh near Odemis. The female began to dig a pit with its front legs. The ground was stony, sparsely covered with grasses and herbs. The soil was pushed away with the hind legs. After 20 minutes of such activity the pit was 15-20 cm deep, 20 cm in diameter at earth level and 5 cm at the bottom. The female laid 3 eggs at 4-5 minutes intervals and afterwards soil was pushed backwards by the hind legs to cover the eggs partially. 10 minutes later 2 more eggs were laid at 5 minutes intervals into the same pit, which was then completely covered, mainly by help from the hind legs. The entire programme was completed in about 70 minutes.

**SAURIA**

*Hemidactylus turcicus turcicus* Linnaeus

*Agrama sielio sielio* Linnaeus
Bornova near Izmir. 4.VI.1968 (4 and 2 juveniles).
Efesus, south of Izmir. 8.VI.1968 (3 and 1 juvenile).
Birgi near Odedemis. 12.VI.1968 (1).
Boz Dagh, east of Izmir near Odedemis. 14.VI.1968 (1).
Efesus, south of Izmir. 23.VI.1970 (5).
Efesus, south of Izmir. 1.VII.1970 (G.N.M. Re. ex. 3282) (1).
Efesus, south of Izmir. 2.VII.1970 (1).


Common in most dry areas in the southern part of Anatolia; seems well adapted to the many ancient and ruined towns in southern Turkey.

*Anguis fragilis colchicus* Nordman
Belgrad Forest, north of Istanbul. 29.V.1968 (5).
Belgrad Forest, north of Istanbul. 13.VII.1979 (G.N.M. Re. ex. 3283) (1).

*Ophisaurus apodus* Pallas
Haikali near Istanbul. 30.V.1968 (2).
Efesus, south of Izmir. 9.VI.1968 (2).
Birgi near Odedemis. 12.VI.1968 (1).
Efesus, south of Izmir. 20.VI.2.VII.1970 (G.N.M. Re. ex. 3284) (6).

*Lacerta danfordii danfordii* Günter

Lacerta danfordii anatolica* Werner
Boz Dagh, east of Izmir near Odedemis. 29.VI.1968 (4).
Boz Dagh, east of Izmir near Odedemis. 30.VI.1970 (2).

*Lacerta taurica taurica* Pallas
Belgrad Forest, north of Istanbul. 2.VIII.1973 (1).
**Lacerta trilineata cariensis** Peters
Bornova near Izmir. 4.VI.1968 (1).
Boz Dagh, east of Izmir near Odemis, 12.VI.1968 (4).
Boz Dagh, east of Izmir near Odemis, 28.VI.1970 (1).  
*Lacerta viridis meridionalis* Cyren
Belgrad Forest, north of Istanbul, 29.V.1968 (2).
Efesus, south of Izmir, 8.VII.1968 (1).
Belgrad Forest, north of Istanbul, 2.VIII.1973 (1).  
*Ophisops elegans chenbergi* Wiegemann
Belgrad Forest, north of Istanbul, 26.V.1968 (3).
Kepez, Prov. Balikisir, 1.VI.1968 (3).
Foca near Izmir, 3.VI.1968 (2).
Bornova near Izmir, 19.VI.1970 (5).
Xanthos (Kilik), Prov. Mugla, 29.VII.1971 (1).
Marmaris, Prov. Mugla, 1.II.1972 (1).
*Abelpharus kitabebi kitabebi* Bibron & Bory
Boz Dagh, east of Izmir near Odemis, 13.VI.1968 (2).
Belgrad Forest, north of Istanbul, 23.VI.1968 (1).
Efesus, south of Izmir, 20.VI.1970 (1).
Xanthos (Kilik), Prov. Mugla, 29.XII.1971 (1).
*Blana stracha* Bedriaga
Efesus, south of Izmir, 9.VI.1968 (9).
Birgi, east of Izmir near Odemis, 12.VI.1668 (4).
Efesus, south of Izmir, 20.VI.1970 (1).
Xanthos (Kilik), Prov. Mugla, 28.XII.1971 (1).

All specimens of this amphibiaenian were found under stones. The Xanthos specimen was identified by a sloughed skin.  
*Chamaeleo chamaeleon chamaeleon* Linnaeus  
Xanthos (Kilik), Prov. Mugla, 29.XII.1971 (G.N.M. Re. ex. 3317) (1).  

**Serpentes**

*Typhlops vermicularis* Merrem
Urla near Izmir, 6.VI.1968 (1).
Efesus, south of Izmir, 8.VII.1968 (4).

Digging species, was found only under stones.  
*Eryx jaculus turcicus* Oliver  
Efesus, south of Izmir, 9.VI.1968 (3).

Digging species, was only found in the early morning, under stones.  
*Coluber jugularis jugularis* Linnaeus  
*Coluber jugularis capitus* Gmelin
Efesus, south of Izmir, 18.VI.1668 (2).
Efesus, south of Izmir, 25.VI.1970 (G.N.M. Re. ex. 3329) (1).
Two melanotic specimens of *Coluber jugularis* found dead in Efesus 1968; one melanotic specimen collected in 1970. All three completely black-violet, except the throat, which was deep red. The 1970 specimen had the following characteristics: length 1620 mm, ventralia 2+190+1 and subcaudalia 111/111+1. According to Wettstein (1953) only *C.j. jugularis* has been found showing a melanotic variety. From the melanotic specimen preserved, the locality and number of ventralia suggest it to be *C.j. caspius*; its appearance and number of subcaudalia indicates *C.j. jugularis*.

Pholidoses scale characters concerning *C.j. jugularis* and *C.j. caspius* from the whole geographical range (except Creta and Phodos) (Wettstein, 1953).

<table>
<thead>
<tr>
<th>Ventralia</th>
<th>Subcaudalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.j. jugularis</td>
<td>199-214 (mean 206)</td>
</tr>
<tr>
<td>C.j. caspius</td>
<td>192-209 (mean 199)</td>
</tr>
</tbody>
</table>

A normal coloured *Coluber jugularis* found in Boz Dag, near Odemis, NE of Efesus, had 3+198+2 ventralia and 110/110+1 subcaudalia, and in this area *C.j. caspius* is present (Mertens, 1952). We have not been able to find reliable information concerning the geographical range of *C.j. jugularis* and *C.j. caspius* in Anatolia. However, according to distribution maps (Steward, 1971), *C.j. caspius* occurs in the Efesus region.

*Coluber raticgeri nummifer* Reuss Efesus, south of Izmir. 21.VI.1970 (1).

This large specimen (1.5 M), unfortunately lost, had one subocular plate and one supralabialia and cataracts on both eyes. Another snake found at the same place and date (believed to be the same species), almost immediately disappeared behind a stone wall. Both snakes had the same markings, a zigzag band which led into straight parallel lines on the tail.

*Coluber najadum dahlii* Schinz Ciglica Forest, 20 km SSW of Etmali. Prov. Anatolya. 14.IV.1972 (5) (G.N.M. Re. ex. 3321 (1)).

*Elaphe longissima longissima* Laurenti Belgrad Forest, north of Istanbul 23.VI.1968 (1).

*Elaphe situla* Linnaeus Efesus, south of Izmir. 20.VII.1970 (1).

Specimen of spotted variety, collected at the time of sloughing.

*Coronella austrina austrina* Laurenti Belgrad Forest, north of Istanbul. 22.VI.1968 (1).
Belgrad Forest, north of Istanbul. 20.VII.1970 (2).

Specimen from Belgrad Forest (22.VI.1968) was an adult female. It gave birth to 8 juveniles in captivity (20.VIII.1968).

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Ventralia</th>
<th>Anal</th>
<th>Subcaudalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>(2 +) 166</td>
<td>3</td>
<td>48/48 + 1</td>
</tr>
<tr>
<td>Juvenile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>(2 +) 171</td>
<td>3</td>
<td>47/47 + 1</td>
</tr>
<tr>
<td>156</td>
<td>(2 +) 160</td>
<td>2</td>
<td>47/47 + 1</td>
</tr>
<tr>
<td>170</td>
<td>(1 +) 202</td>
<td>2</td>
<td>52/52 + 1</td>
</tr>
<tr>
<td>161</td>
<td>(2 +) 178</td>
<td>2</td>
<td>45/45 + 1</td>
</tr>
<tr>
<td>168</td>
<td>(3 +) 163</td>
<td>2</td>
<td>4/5 + 7 + 42/42 + 2</td>
</tr>
<tr>
<td>165</td>
<td>(2 +) 162</td>
<td>2</td>
<td>57/57 + 1</td>
</tr>
<tr>
<td>171</td>
<td>(3 +) 178</td>
<td>2</td>
<td>20/20 + 8 + 2/2 + 1 + 14/14 + 2</td>
</tr>
<tr>
<td>175</td>
<td>(2 +) 179</td>
<td>2</td>
<td>50/50 + 2</td>
</tr>
</tbody>
</table>

579
Fig. 1. *Bufo v. viridis* Laurenti in amplexus at the bottom of a small pond in Ciglicara forest. 11.IV.1972.

Fig. 2. *Testudo graeca iberia* Pallas during egg laying, in Boz Dağ, 13.VI.1968.

Fig. 3. *Natrix natrix persa* (Pallas) found in Ciglicara forest.
Fig. 4. Hibernating area for Coluber jugularis Linnaeus, Coluber najadum dahti Schinz, Natrix natrix persa (Pallas) and Vipera x. xanthina (Gray) in Kuhu Dag Mountains, Province Anatolya.

Fig. 5. A female Vipera ammodytes montandoni Boulenger, from Belgrad Forest, north of Istanbul.

Fig. 6. The habitat of Vipera ammodytes montandoni, in Belgrad Forest, characterized by open sclerophyllous vegetation on sandy ground.
Eirenis modestus modestus Martin
Foca near Izmir. 3.VI.1968 (1).
Urfa near Izmir. 6.VI.1968 (4).
Efesus, south of Izmir. 5.VI.1968 (6).
Efesus, south of Izmir. 2.VII.1970 (G.N.M. Re. ex. 3285) (1).
Ayvalık, Prov. Balikisli. 6.VII.1970 (G.N.M. Re. ex. 3285) (1).
Finnik, Prov. Anatalya. 15.V.1972 (1).

One Eirenis specimen collected in Urfa near Izmir (6.VI.1968) showed characteristics more similar to Eirenis decentinana than to E.modestus (Nikolskii, 1964). Unfortunately the specimen was lost and only field notices and colour photos are still available. The 10 Eirenis specimens collected (4 from Urfa) all showed typical E.modestus characteristics: length 20–40 cm, dorsal surface with a pattern, neck with a transverse black or dark brown band with a yellow margin anteriorly and posteriorly, and a yellow ventral surface. The aberrant specimen was about 60 cm in length, dorsal surface pale brown with double dark brown longitudinal lines, neck without pattern and a white ventral surface. As scale characteristics are missing, it is not possible to give an exact classification of this aberrant specimen.

Natrix natrix persa Fallas (fig. 3)
Belgrad Forest, north of Istanbul. 29.V.1968 (1 juvenile).
Efesus, south of Izmir. 8.VI.1968 (2).
Belgrad Forest, north of Istanbul. 28.VII.1970 (G.N.M. Re. ex. 3287) (2).

In the two adult specimens from the Belgrad Forest the two light lines along the body (normally found on this subspecies), were missing.

Natrix tessellata tesselata Laurenti
Halkali by Istanbul. 30.V.1968 (2).
Kepus. Province Balikisli. 1.VI.1968 (6).
Kyzly Lake. Province Balikisli. 9.VII.1970 (G.N.M. Re. ex. 3288) (2).
Belgrad Forest, north of Istanbul. 15.VII.1970 (G.N.M. Re. ex. 3389) (2).


It is probable that specimens in areas which feed on fish, grow larger than those in areas where frogs are the only prey.

Malpolon monspessulanus insignitus Geoffroy
Belgrad Forest, north of Istanbul. 13.VII.1970 (2).
Vipera ammodytes montandoni Boie-Long (fig. 5).
Belgrad Forest, north of Istanbul. 18.VII.1970 (1 female, alive).
Belgrad Forest, north of Istanbul. 18.VII.1970 (1 female, alive).
655 = 597 + 58 mm; Sq. 21, V. (1 +) 146, A.1, Sc.32/32 + 1.
The pregnant female gave birth to 11 young (15.IX.1970). 3 were preserved:
2 juveniles were preserved at their birth:
Female, 179 = 158 + 21 mm; Sq. 21, V. (2 +) 140, A.1, Sc.32/32 + 1 (D.Z.G.)
Male, 194 = 168 + 26 mm; Sq. 21, V. (1 +) 146, A.1, Sc.35/35 + 1 (D.Z.G.)
The 3rd, a male, preserved as adult (16.VI.1973):
566 = 502 + 64 mm; Sq. 21, V. (1 +) 150, A.1, Sc.35/35 + 1 (G.N.M. Re. ex. 3019).

In the two adults the shape of the rostral plate (max. height/breadth) is 1.40 (female) and 1.54 (male). The horn is 2-3 scales high above the rostral plate, and formed of 8-12 scales. The ground-colour is light brown (female), grey-beige (male), both with dark brown markings. The vertebral markings are unbroken zigzag bands, which are dark bordered on the male. Laterally, there is a horizontal row of dark-brown diffuse blotches, which are darker than the ground-colour. The underside is light-brown, with a diffuse dark-
brown pattern of tiny spots. The posterior third of the unmarked ventral side of the tail is green-gray in colour, with a green-yellow tip.

According to Eiselt & Baran (1970), the asialic populations of Vipera ammodytes at the Bosphorus belong to V.a. meridianalis, for the number of ventral plates was within the limits of that subspecies. However, they pointed out that the shape of the rostral plate (higher than broad), of these northern Anatolian populations, agreed with the rostral plate of V.a. montandoni. In V.a. meridianalis the height and breadth of the rostral plate are equal (Boulenger, 1913). They did not study specimens from the European side of the Bosphorus, and did not discuss the taxonomic status of the populations of that area. The shape of the rostral plate of our 4 specimens from the Belgrad Forest, north of Istanbul, is characteristic of V.a. montandoni. They also have other characteristics, which taxonomically should place these populations of north-eastern Thrace, contrary to Bodenheimer (1944), into the subspecies V.a. montandoni. According to Eiselt & Baran (1970), the reduced snouthorn, extension of the rostral plate and increase in the number of ventral plates are characteristic of V.a. montandoni.

Pholidoses of V.a. meridianalis and V.a. montandoni; geographical range (Boulenger, 1913), and V. ammodytes from the Belgrad Forest.

<table>
<thead>
<tr>
<th>Subspecies</th>
<th>Rostral height to breadth</th>
<th>Number of ventrales</th>
<th>Total number of horn scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.a. meridianalis</td>
<td>same</td>
<td>133-147</td>
<td>14-20</td>
</tr>
<tr>
<td>V.a. montandoni</td>
<td>higher than broad</td>
<td>149-158</td>
<td>10-14</td>
</tr>
<tr>
<td>V. ammodytes</td>
<td>higher than broad</td>
<td>140-150</td>
<td>8-12</td>
</tr>
</tbody>
</table>

(Belgrad Forest)

The number of ventral plates on our specimens, 140-150, is within the range of both subspecies. The snout-horn (8-10 scales) and the shape of the rostral plate suggest V.a. montandoni. The length of the adults and the position of the snout-horn, in the two adult specimens, perpendicular to the head are more typical of V.a. montandoni than V.a. meridianalis (Clark, 1965). In the two juvenile specimens the snout-horn is pressed backwards along the head.

In Roumania, V.a. montandoni occurs in a lowland zone along the coast of the Black Sea (Fuhn & Vanea, 1961). In Bulgaria it occurs along the coast to the Turkish boarder (Buresch & Zonkow, 1934). Eiselt & Baran (1970) reported specimens from the coastal area of northern Thrace, province Kirkarell, which belong to V.a. montandoni. Bodenheimer (1944) wrote, “it is common in the whole of Thrace”. The range is obviously continuous for Vipera ammodytes along the western and south-western coasts of the Black Sea and should allow inter-breeding between this populations. Along the coastal area, the species occurs in a lowland biotope. The choice of biotope in the Belgrad Forest is open sclerophyllous, vegetation areas on sandy grounds. The area lacks rocky or stony habitats, which normally characterize the biotope of Vipera ammodytes.

Vipera zanthina zanthina Gray
Efesus, south of Izmir, 9.VI.1968 (1 juvenile).
Efesus, south of Izmir, 26.VI.1970 (1).

The adult gravid female from Efesus had 10 embryos in her uterus. The 4 specimens from Cigica Forest (3 males, 1 female), seemed just to have emerged from hibernation. The skins of these vipers, including that over the eye, were quite grey. They were probably undergoing their first shedding for
the year. The juvenile specimen from Efesus, was recognized by its skin, found under a stone.

DISCUSSION

Five species of amphibians and thirty species and subspecies of reptiles were observed in western Turkey. The dominating species were Rana r. ridibunda, Testudo graeca iberia, Ophisops elegans ehrenbergi, Ablepharus kitaibelli and Natrix tessellata. Clemmys caspica inflata was also regularly observed in the area, in ponds and river-systems. Bufo b. spinosus, Ophisaurus apodus, Lacerta viridis meredonialis, Coluber jugularis and Natrix n. persa were less frequently found. Some species were more common in certain regions. Bufo viridis was often seen in Anatolia in aquatic areas. Agama stellio was abundant in dryer areas of south-western Anatolia. It was also seen in the north up to the area of Balikesir.

Further local observations in southwestern Anatolia were made on Hyla arborea, Lacerta danfordi, Lacerta trilineata cartensis, Bimus straussi, Typhlops vermicularis, Eirenis m. modestus and Vipera xanthina. Isolated observations in southwestern Anatolia were made on Hemidactylus t. turcicus, Chamaeleo c. chamaeleon, Eryx jaculus turcicus, Coluber rauvgeri sumnifer, Coluber naja lam dalitii and Elaphe situla. In the Belgrad Forest and adjacent areas of Thrace, an area which is partially covered with montane summergreen forest, Rana dalmatina, Anguis fragilis colchicus, Lacerta t. furaica, Elaphe longissima, Coronella austriaca, Merope mosspesulatus insignitus and Vipera ammodytes montandoni were found.

REFERENCES


