

Remarks on the herpetofauna of the Caucasian Republic of Georgia, with special reference to the Lacertidae

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INTRODUCTION

Many regions of the former USSR still receive little attention from Western visitors, herpetologists not excluded. For the Caucasus Mountains this is all the more surprising since the area forms a zone where northern and Middle Eastern flora and fauna meet, and which is thus of considerably zoogeographical interest.

Presently we find three larger states in the Caucasus: Georgia, Azerbaijan and Armenia. Turkey borders to the southwest, Iran to the southeast, and in the north it is the Russian federation. Various smaller parts claim independence. The Black Sea forms the natural western boundary, the Caspian Sea the eastern one.

Herpetologically the Caucasus is historically well-known because of the work of Darevsky and collaborators on the rock lizards (at the time still in the large genus *Lacerta*, now in *Darevskia*) and the discovery of the first case of parthenogenesis in vertebrates (DAREVSKY, 1967; DAREVSKII, 1978; DAREVSKY & KULIKOVA, 1961).

Below we will concentrate on the results of our field trip to Georgia during the last two weeks of June 2003. Predictably, because of our common interest in the group, the lacertids will receive the most attention.

GEORGIA

The republic of Georgia covers a territory of 69,700 km² and has almost 5.3 million inhabitants, most of who (1.5 million) live in the capital, Tbilisi. For comparison, The Netherlands occupy an area of 40,844 km² and have a population of over 16 million people and Germany covers 356,727 km² with a population of 80 million.

The landscape of Georgia is surprisingly varied, though mainly mountainous. In the north we find the Greater Caucasus Range with snow-covered tops, the highest peak in Georgia being Shkhara at 5201 m. The Kazbeg lies to the east, and though not as high (5047 m) as Shkhara is more well known. Mt. Elbrus lies in Russia and at 5842 m high pales the commonly – but falsely – considered highest mountain in Europe, Mont Blanc (4807 m). The Lesser Caucasus Range found in the south is also very impressive with heights reaching over 3301 m (Mt. Abuli). As well, at higher elevations, glaciers are also found here. The western part of the Lesser Caucasus Range is the Meskheta Range; east of the Kura valley the Trialeti Range starts which ends near Tbilisi. The Likhi Mountain Range, also known as Suram Mountains, divides the country more or less down the middle. To



The surroundings of Zvare receive a lot of rainfall.

Photo: H.A.J. in den Bosch

the west of this range the climate is wetter and the vegetation more luxuriant with tea plantations, bamboo and citrus trees. This is the fertile land of Colchis, colonised by the ancient Greeks in the 8th-6th centuries BC. Moist western winds blowing from the Black Sea provide ample rainfall. The western mountain areas of Abkhazia and Achara receive 2400-3000 mm rain/yr.; Mt. Mtirala northeast of Batumi holds the record of being the wettest place in the western Palearctic. In northern Germany the average yearly rainfall is between 500 mm (494 mm around Magdeburg) and 700 mm, in the lower mountain ranges in central Germany it is between 700-1500 mm (1009 mm in Munich), and in the Alps over 2000 mm. In The Netherlands the typical yearly amount of rainfall is 790 mm.

Around Poti on the Black Sea coast is an area of flat wetlands. To the east the climate is drier, almost steppe-like around Davit Gareja. This is the ancient Iberia, historically influenced by Persia.

In the east all rivers join the Mtkvari, which

starts its life as the Kura (the ancient Cyrus) in Turkey, and flows out through Azerbaijan into the Caspian Sea. West of the Likhi Range all rivers, of which the Rioni and the Enguri are the biggest, flow into the Black Sea.

Extensive mixed deciduous forests cover the lower areas in Georgia. To Western Europeans alders (*Alnus* ssp.), sweet chestnut (*Castanea sativa*), hazel (*Corylus* ssp.), walnut trees (*Juglans regia*) and poplar (*Populus* ssp.) are elements immediately recognisable. In the middle ranges of the mountains we see beech, spruce and pine (*Fagus orientalis* and *Abies nordmannia*) changing into coniferous forests and at higher elevations alpine vegetation takes over with yellow-flowering *Rhododendron* as eye-catching larger elements. Mountain meadows are awash with flowers including *Chrysanthemum*, *Delphinium*, *Scabiosa*, *Ranunculus* and many orchids in June-July. Most conspicuous in the eastern drier areas are the stunningly red *Papaver* in early spring.

The highest lowland temperatures occur in July-August (25°C), while in the capital a murky 30-35°C is not uncommon in summer. In winter the higher regions experience frost (in Tbilisi the temperature falls as low as -10°C). The January temperatures of the lower areas are rarely below freezing, though they can fall to between 0-3°C.



Wet mountain meadows near Bakuriani are an ideal habitat for *Triturus vittatus ophryticus*, *Triturus vulgaris lantzi*, *Bufo viridis*, *Rana macrocnemis*, *Rana ridibunda* and *Darevskia derjugini*.

Photo: H.A.J. in den Bosch



The steppe-like aspect west of Davit Gareja.

Photo: H.A.J. in den Bosch

The Caucasus Mountains have always been taken as the boundary between the continents of Europe and Asia. More precisely the exact border is found in Georgia and follows the main chain of the Greater Caucasus. Thus, south of the chain the rivers flow into the Asian Kura, to the north – in Europe – into the Terek. Obviously, the area north of the Pass of the Cross (or Jvari Pass, 2399 m) is in Europe. Surprisingly perhaps this is also true in a geological sense. The Caucasus forms part of the Alpine-Himalayan tectonic belt where for the past 100 millions years the African, Arabian and Indian plates bumped into the Eurasian plate. The present-day mountain ranges are the result and earthquakes testify that this process is still going on. This is further underlined by the fact that some of the highest summits of the region are volcanoes. Where uplift and erosion has been greatest, granite is exposed. Elsewhere the crumpled sedimentary cover of shale and limestone is visible.

Historically speaking, Georgian independence lasted from 1918-1921 when Stalin incorporated it (together with Azerbaijan and Armenia) as the Transcaucasian Republic into the USSR. Only in 1991, with the collapse of the Soviet Union, did Georgia become independent again, though the following years were not exactly tranquil and even now Abkhazia maintains only a semi-independence. Until very recently – certainly when we visited – Achara was also semi-independent, though obviously under heavy Russian influence.

AMPHIBIANS AND REPTILES OF GEORGIA

At the present time, 12 amphibian species and 52 reptile species (3 turtles, 28 lizards and 21 snakes) are known from this beautiful country.

Taxonomic notes

In the last few years there have been taxonomic changes that concern some of the species that occur in Georgia. For example the systematic status of both Brown Frogs, *Rana macrocnemis* and *Rana camerani*, has been the subject of much discussion. These frogs used to be classified as two separate species, but currently *R. camerani* is considered a synonym of *R. macrocnemis* by several, but not all, researchers. We follow the view of TARKHNISHVILI & GOKHELASHVILI (1999) and regard *R. camerani* as a subspecies of *R. macrocnemis*. Sixteen of the currently identified 26 species of *Darevskia* live in Georgia (cf. BISCHOFF, 2001). These principally saxicolous lizards are closely related. DAREVSKY'S classic 1967 monograph contains elaborate descriptions of these lizards. Recently ARRIBAS (1997, 1999) created the new genus *Darevskia* based on osteological, morphological and behavioural characters. As their common name Caucasus Rock Lizards implies, they inhabit rocky structures, even comparatively horizontal ones like talus. Two species are mainly ground-dwelling: *D. derjugini* and *D. praticola*. Most species have restricted areas of distribution, with the exception of *D. praticola* and *D. rudis*.



Rana macrocnemis.

Photo: H.A.J. in den Bosch

Until proven otherwise, we consider *D. saxicola* to be absent. Only DAREWSKIJ (1984b) mentioned isolated populations south of the Greater Caucasus range in Georgia. However, he did not provide exact localities, and as these are also not found in DAREVSKY (1967) we prefer to be cautious. For the Western Palearctic representative of the genus *Eumeces* GRIFFITH, NGO & MURPHY (2000) created the new genus *Novoeumeces*. However, this name is a synonym of *Eumeces*, since *E. schneiderii pavimentatus* is the type species of the genus (SCHMITZ, MAUSFELD & EMBERT, 2004).

The following three species, *schmidti*, *ravergieri* and *najadum*, which had previously been classified in the genus *Coluber* have been reassigned to the genera *Hierophis*, *Platyceps* and *Tyria* respectively (summary in SCHÄTTI & UTIGER, 2001).

The genus *Elaphe* was identified as containing a large number of species that were not closely related enough to justify their classification into one genus. Therefore UTIGER et al. (2002) recombined its representatives while still maintaining some species within the genus *Elaphe*. In their paper they also promoted the former *Elaphe quatuorlineata sauromates* to species status. The Georgian species *dione* and *sauromates* remain in the genus *Elaphe* after this amendment, whereas *hohenackeri* and *longissimus* now belong in the genus *Zamenis*.

The taxonomically controversial *Natrix megalcephala* Orlov & Tuniyev, 1987 we consider to be, as do BISCHOFF & TARKHNISHVILI (2002), a synonym of *Natrix natrix scutata*.

Taxonomic list of Georgian reptiles and amphibians

Amphibia

Mertensiella caucasica (Waga, 1876): *M. c. caucasica* (Waga, 1876), *M. c. djanashvilii* Tartarashvili & Bakradse, 1989
Triturus karelinii (Strauch, 1870)
Triturus vittatus ophryticus (Berthold, 1846)
Triturus vulgaris lantzi (Wolterstorff, 1914)

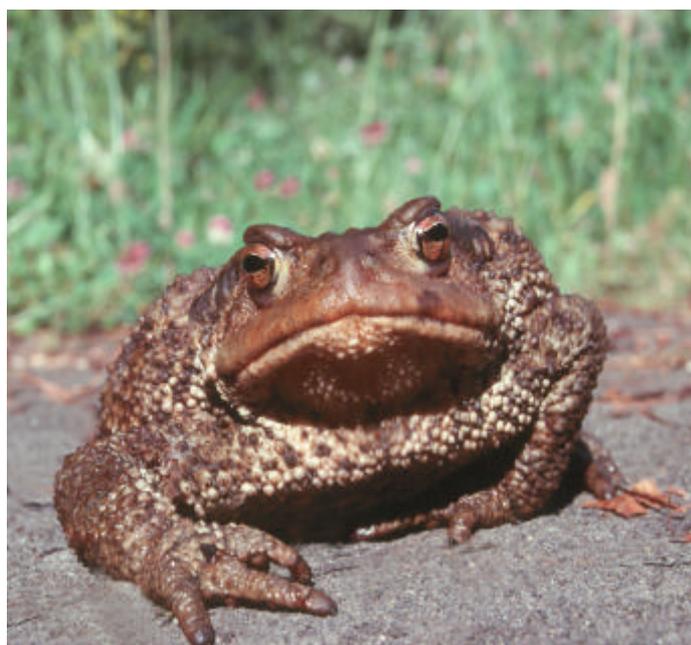
Pelobates syriacus Boettger, 1889
Pelodytes causicus Boulenger, 1896
Bufo v. verrucosissimus (Pallas, 1811)



An adult *Pelobates syriacus*.

Photo: H.A.J. in den Bosch

Bufo viridis Laurenti, 1768
Hyla arborea schelkownikowi Cernov, 1926
Hyla savignyi Audouin, 1827
Rana macrocnemis Boulenger, 1885: *R. m. macrocnemis* Boulenger, 1885, *R. m. camerani* Boulenger, 1886
Rana ridibunda Pallas, 1771



Bufo verrucosissimus can grow to an impressive size.

Photo: H.A.J. in den Bosch



A shallow pool near Udabno in which we found the large tadpoles (left and right bottom) of *Pelobates syriacus*. Top right: the tiny Eastern Spadefoot immediately after metamorphosis.

Photos: H.A.J. in den Bosch

Reptilia

Testudo graeca iberica Pallas, 1814
Mauremys c. caspica (Gmelin, 1774)
Emys orbicularis (Linnaeus, 1758): *E. o. iberica* Eichwald, 1831 *E. o. colchica* Fritz, 1994

Cyrtopodion caspius (Eichwald, 1831)

Laudakia caucasia (Eichwald, 1831)



Laudakia caucasia, an egg-carrying female.

Photo: H.A.J. in den Bosch



The Scheltopusik, *Pseudopus a. apodus*.

Photo: H.A.J. in den Bosch

Anguis fragilis colchicus (Nordmann, 1840)
Pseudopus a. apodus (Pallas, 1775)

Ablepharus pannonicus (Lichtenstein, 1823)
Eumeces schneiderii princeps (Eichwald, 1839)

Eremias arguta transcaucasica Darevsky, 1953

Eremias velox caucasia Lantz, 1928

Ophisops e. elegans Ménétriés, 1832
Lacerta agilis Linnaeus, 1758: *L. a. brevicaudata* Peters, 1958, *L. a. grusinica* Peters, 1960, *L. a. ioriensis* Peters & Muskhelishvili, 1968

Lacerta m. media Lantz & Cyrén, 1920
Lacerta strigata Eichwald, 1831

Darevskia alpina (Darevsky, 1967)
Darevskia „armeniaca“ (Méhely, 1909)
Darevskia b. brauneri (Méhely, 1909)
Darevskia c. caucasica (Méhely, 1909)
Darevskia clarkorum (Darevsky & Vedmederja, 1977)

Darevskia „dahli“ (Darevsky, 1957)
Darevskia daghestanica (Darevsky, 1967)
Darevskia derjugini (Nikolskij, 1898): *D. d. derjugini* (Nikolskij, 1898), *D. d. abchasica* (Bischoff, 1982), *D. d. barani* (Bischoff, 1982), *D. d. boehmei* (Bischoff, 1982), *D. d. orlovae* (Bischoff, 1984)

Darevskia mixta (Méhely, 1909)
Darevskia nairensis (Darevsky, 1967)
Darevskia parvula adjarica (Darevsky & Eiselt, 1980)

Darevskia portschinskii (Kessler, 1878)
Darevskia praticola (Eversmann, 1834): *D. p. praticola* (Eversmann, 1834), *D. p. pontica* (Lantz & Cyrén, 1919)

Darevskia rudis (Bedriaga, 1886): *D. r. bischoffi* (Böhme & Budack, 1977), *D. r. chechenica* (Eiselt & Darevsky, 1991), *D. r. macromaculata* (Darevsky, 1967), *D. r. obscura* (Lantz & Cyrén, 1936), *D. r. sva-netica* (Darevsky & Eiselt, 1980)

Darevskia „unisexualis“ (Darevsky, 1966)
Darevskia v. valentini (Boettger, 1892)

Typhlops vermicularis Merrem, 1820

Eryx jaculus turcicus (Olivier, 1801)

Coronella austriaca Laurenti, 1768
Eirenis collaris (Ménétriés, 1832)
Eirenis m. modestus (Martin, 1838)
Elaphe dione (Pallas, 1773)
Elaphe sauromates (Pallas, 1814)
Hierophis schmidtii (Nikolskij, 1909)
Malpolon monspessulanus insignitus (Geoffroy, 1827)
Natrix natrix scutata (Pallas, 1771) (syn.: *Natrix megalcephala* Orlov & Tuniyev, 1987)
Natrix tessellata (Laurenti, 1768)
Platyceps ravergieri (Ménétriés, 1832)

Telescopus fallax iberus (Eichwald, 1831)
Tyria n. najadum (Eichwald, 1831)
Zamenis h. hohenackeri (Strauch, 1873)
Zamenis l. longissimus (Laurenti, 1768)



From top to bottom:

Eirenis modestus modestus.

Photo: W. Bischoff

Zamenis longissimus longissimus.

Tyria najadum najadum was only found once on this trip.

Photos: H.A.J. in den Bosch

Macrovipera lebetina obtusa (Dwigubskij, 1832)

Vipera ammodytes transcaucasiana Boulenger, 1913

Vipera dinniki Nikolskij, 1913

Vipera kaznakovi Nikolskij, 1909

Vipera ursinii renardi (Christoph, 1861)

Possibly *Vipera barani* Böhme & Joger, 1983 occurs in the border regions of Georgia and Turkey (Joger, pers. com.).

As has been pointed out before (BISCHOFF & TARKHNISHVILI, 2002) the herpetofauna of the Caucasian territory remarkably enough does not have direct relationships to that of the Russian Federation, which, after all, lies immediately north of the Greater Caucasus Range (cf. BANNIKOV et al., 1977). Even species that are widely distributed in Russia, like *Bufo bufo* (Linnaeus, 1758), *Rana arvalis* Nilsson, 1842, *Rana temporaria* Linnaeus, 1758, *Zootoca vivipara* (Jacquin, 1787) and *Vipera berus* (Linnaeus, 1758) do not reach the area. Almost all relationships point in the southerly direction of Turkey. Even European faunal elements, like *Triturus vulgaris* (Linnaeus, 1758), *Hyla arborea* (Linnaeus, 1758), *Anguis fragilis*

Linnaeus, 1758, *Coronella austriaca* Laurenti, 1768 and *Natrix natrix* (Linnaeus, 1758), apparently reached the Caucasian region via the southern Black Sea coast as indicated by the subspecific classification of most taxa.

This can be explained by the climatological and geological history. For a long time the Caucasian region was a peninsula that only became connected to the southern Russian plateau in the Pliocene. During the Ice Ages in the Pleistocene no amphibians or reptiles could live north of the Caucasus mountain ranges, but it was possible for them to live south (cf. BISCHOFF, 1984; JABLOKOV, 1976). These species occupied all possible habitats after the ice retreated. Secondly some species reached the Transcaucasus after the last ice age via the northern route. Examples are *Natrix natrix scutata* (Pallas, 1771) and *Lacerta agilis exigua* Eichwald, 1831. Two *Darevskia* species expanded their ranges via the northern coast of the Black Sea in the post-glacial period: *D. lindholmi* that lives on the Crimea, and *D. praticola* with island-like distribution areas in Rumania, Bulgaria, Serbia and the European part of Turkey.

In Georgia both the common greyish as well as the reddish colour form of *Coronella austriaca* occurs.

Photos: H.A.J. in den Bosch



REMARKS ON THE SPECIES

This section includes miscellaneous remarks and data relating to the species that we encountered. We added maximum measurements on head-body + tail length (HB+T) for the lizards we came across to serve as a general size indication.

Anguis fragilis colchicus (Nordmann, 1840)

For a long time, and even now in popular publications, this subspecific name was given to *Anguis fragilis* with blue spots, particularly in the Balkans. However, as MUSTERS & IN DEN BOSCH (1982) demonstrated, this is unjustified for males of *A. f. colchicus* tend to show more blue spots, and at an earlier age, than the nominate form. *A. f. colchicus* is characterised by a visible ear opening and at least 26 scale rows. As then, one of us (HidB) still wonders whether retention of *colchicus* as a subspecies is justified.

In a female from Zvare and a male from Mt. Urta we counted 26 and 27 scale rows respectively, the male showing blue spots, and both possessing external ear openings, which were clearest in the male. Of course the form got its subspecific name from the general geographical area of Colchis, more specifically the Kuban district and Mingrelia. Oddly enough this terra typica lies north of the Greater Caucasus, thus in fact is not in the Colchis region.

A male measured 178+152 mm (tail regenerated), a female 165+128 (tail regenerated).



Testudo graeca iberica Pallas, 1814

It is commonly thought that the subspecies name of this form is a misnomer because it is not found in Spain or Portugal, the Iberian Peninsula. However, this is not the case: Pallas described this tortoise from the ancient Iberia (or Ivera), the drier eastern part of Georgia.

We saw adults and youngsters from last year, with nice clear patterning, browsing the vegetation, but no measurements were taken.



Top: An adult *Testudo graeca iberica* on the move near Davit Gareja after a shower.

Bottom: A young *Testudo graeca iberica* in the same area.

Photos : H.A.J. in den Bosch

A male *Anguis fragilis colchicus* on the path next to the field station of Tbilisi University in Akhaldaba. On the inset one can see, with some difficulty, the for the subspecies characteristic ear opening.

Photos: H.A.J. in den Bosch



Habitat of *Eremias velox caucasica*. Insets (top to bottom): adult female, adult male, and a juvenile.

Photos: H.A.J. in den Bosch

Eremias velox caucasica Lantz, 1928

This species is found only in the eastern parts of Georgia. On 20vi2003 we located several specimens in a valley in the steppe-like region near Davit Gareja. The young animals had brightly red coloured tails. We stumbled on a mating pair. With still a reddish tinge on her tail, characteristically present in juveniles, we suspected the female in this copula to have been quite young.

Male 61+104 mm, female 62+84 mm (tail regenerated).

Lacerta agilis ssp.

In Georgia we find three subspecies of *Lacerta agilis*: *L. a. brevicaudata* Peters,

1958, *L. a. grusinica* Peters, 1960 and *L. a. ioriensis* Peters & Muskhelishvili, 1968. In a recent paper (KALYABINA et al., 2001) it is argued that the genetic distances between the Caucasian subspecies of *L. agilis* are minimal and that only *L. a. boemica* can be distinguished genetically. To us this is incomprehensible and might indicate the

use of improper criteria by KALYABINA et al. (2001) to distinguish these subspecific forms. There are clearly quite major morphological and ecological distinctions between the *L. agilis* forms in the Caucasus. *L. a. brevicaudata* lives at higher elevations in a steppe-like habitat, *L. a. grusinica* lives in a subtropical climate in the coastal area of the Black Sea, including the Colchis lowland, and *L. a. ioriensis* is known only from the surroundings of the small city of Tianeti on the banks of the Iori. The Iori valley is a climatologically favourable area, i.e. during the summer months neither too hot nor too dry. To the north the

form is isolated from *L. a. boemica* by the, for the species, impassable main chain of the Caucasus Mts., and to the south from *L. a. brevicaudata* by the hot and dry Kura plateau (PETERS & MUSKHELISHVILI, 1968). Briefly-worded the three Georgian subspecies of *Lacerta agilis* can be distinguished as follows: in *L. a. grusinica* both male and female are dorsally green. The brown coloured females we found in Kobuleti (see below) are an absolute novelty. This is the subspecies with the longest heads. Characteristic of this subspecies is the predominant configuration of 2 postnasals and 0 frenalialia behind the nostril. The males of *L. a. brevicaudata* are likewise green; the females – like most of the Caucasian subspecies – are brown. The dark spots on the backs of the females are quite irregular and surrounded by brighter edges. This is, as the name implies, the subspecies with the shortest tail. The nasofrenal scalation is mainly in the configuration 2/2. *Lacerta a. ioriensis* is similar to *L. a. brevicaudata* in

coloration and patterning. It has the shortest legs of all Caucasian *Lacerta agilis* and also the lowest transverse dorsal count (on average 41.5; *L. grusinica* 49.2; *L. brevicaduta* 45.7). The nasofrenal configuration is generally 2/1.

Lacerta agilis grusinica Peters, 1960

Because of technical problems with our 4WD Lada, we had, purely by accident, the opportunity to find remarkably coloured specimens of *L. a. grusinica* in a very insignificant public garden in Kobuleti. The males were green; the females were sometimes green, but also brown (similar to the females of the other Caucasian subspecies of *L. agilis*).

The subspecific name refers to the region in which they are found, i.e. Georgia. Superficially, these lizards show a remarkable likeness to *Lacerta viridis*.

Males 108+167 mm, females 111+156 mm.

Lacerta media media Lantz & Cyrén, 1920

This species almost reaches its most northern distribution limit in Georgia. To the south we find *L. media* as far as Israel, in the east Iran forms the perimeter. The animals are frequently heard, running away through the undergrowth, before they are seen. *L. media* is more commonly found in the relatively drier eastern parts of Georgia, but can also be encountered in other parts



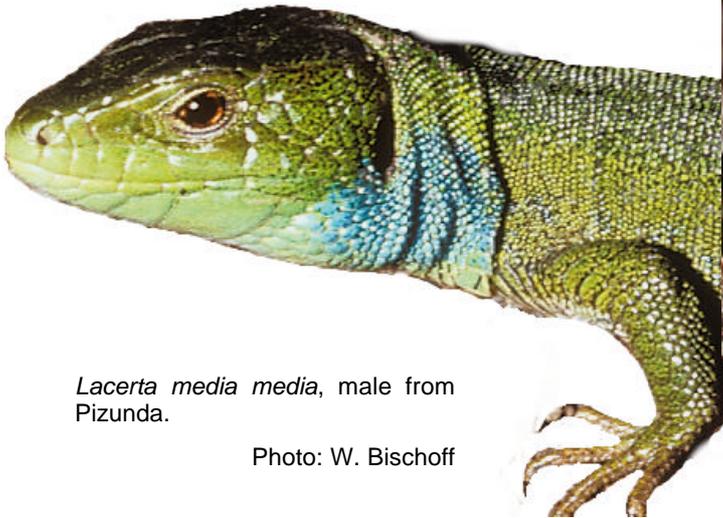
To Western Europeans a female *Lacerta agilis grusinica* is quite similar to *Lacerta viridis*.

Photo: H.A.J. in den Bosch



A public garden in Kobuleti as locality of *Lacerta agilis grusinica*. Top right a brown coloured female, bottom left a male.

Photos: H.A.J. in den Bosch



Lacerta media media, male from Pizunda.

Photo: W. Bischoff



A female *Lacerta media media*.

Photo: H.A.J. in den Bosch

of the country, though not above 1200 m. Maximal head-body length of Georgian males is 128 mm, with a relatively short tail (after PETERS, 1964). Further data on measurements seems to be lacking in the literature.

Lacerta strigata Eichwald, 1831

We found *Lacerta strigata* in the shrubby surroundings of the church ruins of Ananuri and near Davit Gareja. It sometimes lives in the same localities as *L. media*. The latter is restricted to the drier montane slopes, the former lives in moister areas near the water. The situation in Tbilisi forms a nice exam-



A juvenile *Lacerta strigata*.

Photo: W. Bischoff



A male *Lacerta strigata* from Udsharma.

Photo: W. Bischoff

ple: *L. media* lives in the surrounding partly denuded hills, *L. strigata* can be found in parks in the city.

Males measure up to 110+238 mm, females 112+235 mm.

Darevskia „armeniaca“ (Méhely, 1909)

We found *D. „armeniaca“* in the middle and higher regions of the eastern Lesser Caucasus (Trialeti Mountains) and on the neighbouring Javakheti plateau at altitudes between 1350-2200 m. Locally, astounding aggregations of lizards can be observed.

This lacertid became world-famous when DAREVSKY & KULIKOVA (1961) showed that *D. „armeniaca“* reproduced parthenogenetically, at the time the first such case in reptiles. According to UZZELL & DAREVSKY (1975) *D. „armeniaca“* is the result of a cross between *D. valentini* and *D. mixta*.

The older, larger females show a greenish dorsal coloration. Reproductive data of this form and *Darevskia „unisexualis“* can be found in IN DEN BOSCH (1999).

Females 66+107 mm (regenerated tail).



Along the unpaved road over the Tskhra-Tskaro Pass *Darevskia „armeniaca“* lives in large populations.

Photo: H.A.J. in den Bosch



The parthenogenetic lizard *Darevskia „armeniaca“* may live in masses. Here as found on the Javakheti plateau.

Photos: H.A.J. in den Bosch (overview and small inset)
W. Bischoff (large inset).

Darevskia caucasica caucasica (Méhely, 1909)

On 19vi2003 in the Dariali Gorge, 10 km north of Kazbegi (1355 m) along the Tergi River, most of the females that were observed were plump with eggs. One female appeared to have oviposited very recently as she was quite 'flat' and still had some wet clay on her head and forelegs when caught around 14:00. Remarkably, the males show bright green dorsolateral bands and the females are dorsally brown (some with slightly beige dorsolateral bands), while the more southern populations (south of Kobi, but already north of the 'Pass of the Cross' (Jvari Pass, 2399 m)) are dorsally uniformly green and the females show a green dorsal coloration in the reproductive period.



Darevskia c. caucasica in the Dariali Gorge. Bottom left a male, on the right a talus slope as typical habitat. Insets: two females.

Photos: H.A.J. in den Bosch

These lizards showed themselves as soon as the sun came out and disappeared again when clouds obscured the sunshine. This reaction occurred because the heat generated was purely radiant heat from the sun, rather than the ambient temperature - a fact supported by the various snow patches in the neighbourhood and the bitterly cold wind that chilled us to the bone, even in mid-July, when a cloud passed in front of the sun. *D. caucasica* is a typical mountain lizard: altitudinal range of our (incl. BISCHOFF & TARKHNISHVILI, 2002) finds: 1200-2200 m. According to DAREWSKIJ (1984a) even 3200 m has been reached. Its habitat is not primarily rocky cliffs as might be expected, but rather slopes of stone debris.

With live material of localities from both north and south of the Pass of the Cross still available to us, we cannot but feel that certainly in patterning and coloration these two *D. caucasica* populations are dissimilar. Males 52+107 mm, females 53+97 mm (regenerated tail).

Darevskia clarkorum (Darevsky & Vedmerja, 1977)

SCHMIDTLER et al. (2002) proved that *Lacerta dryada* Darevsky & Tuniyev, 1997 belongs in the synonymy of *D. clarkorum*. In hindsight, it is astounding that this form, described from the Charnali river valley just northeast of Batumi on the Black Sea coast, could have been considered to be different as there is absolutely no biological barrier between this area and the terra typica of *D. clarkorum* just 20 km to the south in Turkey



Male *Darevskia clarkorum*. The species prefers humid surroundings.

Photo: H.A.J. in den Bosch

(Cankurtaran pass). All the more surprising, since Darevsky was involved in the description of both forms.

To one of us (HidB) the habitat on the banks of the Charnali was in several aspects astonishingly similar to that of *Algyroides marchi*; moister and more shady than perhaps would be expected of rock-dwelling lizard species (see also: Lizard communities).

Males 69+136 mm, females 68+126 mm.

Darevskia „dahli“ (Darevsky, 1957)

According to UZZELL & DAREVSKY (1975) this parthenogenetic form is the result of hybridisation between *D. mixta* and *D. portschinskii*. It is a rare lizard.

Thanks to the assistance of our friend, David Tarkhnishvili, we were able to find dozens of specimens of *D. „dahli“* in one locality - an inclined rocky plateau next to the rivulet Kojori, near the village of Kojori. Syntopically a few *D. portschinskii* lived approximately 150 m higher up on a rocky cliff. In this spot, *D. portschinskii* was much more common while *D. „dahli“* was entirely absent.

Actually, it was initially quite difficult to distinguish between both forms. The former is dorsally just as greyish brown as the latter, but depending on the light showed a greenish shimmer rarely seen in *D. portschinskii*.

Females 60+102 mm (regenerated tail).

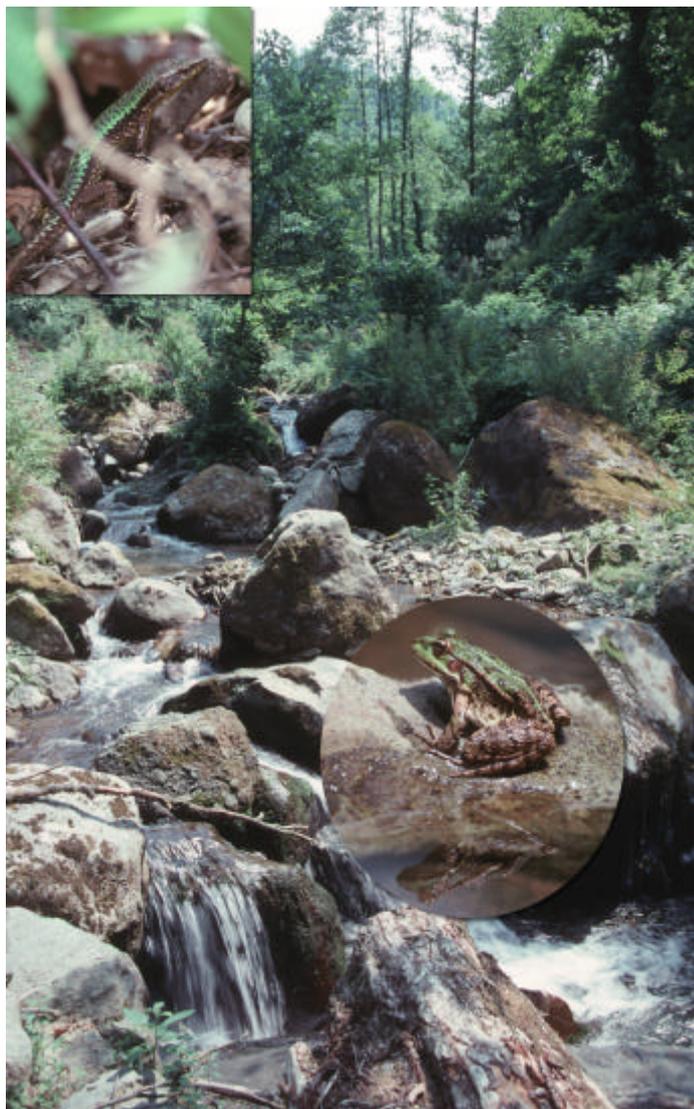
Darevskia derjugini (Nikolskij, 1898)

In the Caucasian area *D. derjugini* is the ecological equivalent of *Zootoca vivipara*. It usually prefers somewhat moist, shady habitats in forested areas. In Georgia this lizard is distributed widely, lacking only in the eastern steppe regions. *D. derjugini* is the only representative of the genus in the Colchis lowlands. Five of the presently six recognised subspecies occur in Georgia, some are even restricted to this country.

Males 54+87 mm (regenerated tail), females 64+ 91 mm (regenerated tail).

Darevskia mixta (Méhely, 1909)

This is the only endemic herp species in Georgia. On 26vi03 we observed many specimens on the decrepit buildings of a still-functioning sawmill in the Banishkhevi valley near Rveli (alt. 850 m). There, as



In the Charnali valley we found *Darevskia clarkorum* (male top left) and *Rana ridibunda* (inset bottom right).

Photos: H.A.J. in den Bosch

well as next to the field station of Tbilisi university near Achaldaba, we saw both pregnant females as well as those who had recently oviposited. On 29vi03, approx. 9:30 HidB saw the introduction to mating, which may well have resulted in a copulation but the animals disappeared into the undergrowth after the first bites in the female's flank, emerging separately approximately 30 seconds later.

Even though *D. mixta* climbs with great agility on vertical structures, we also observed them in a wet meadow and on piles of timber.

The epitheton specificum refers to Méhely's (1909) incorrect assumption that this taxon was a cross, namely between *D. derjugini* and *D. saxicola*. DAREVSKY (1967) agreed



A male *Darevskia mixta* in the Banishkhevi valley with the sawmill in the background. Inset: female *D. mixta* on the wall of one of the annexes.

Photos: H.A.J. in den Bosch

with this idea, but FU et al. (1997) pleaded for a hybridisation between *D. caucasica* and *D. saxicola*. A curious hypothesis, as both the latter species lives in the Greater Caucasus and *D. mixta* in the Lesser Caucasus Mts.

Males 54+65 mm (regenerated tail), females 55+69 mm (regenerated tail).

Darevskia nairensis (Darevsky, 1967)

Exactly thirty years ago one of us (WB) was the first one to report this species for Georgia (BISCHOFF & ENGELMANN, 1976). The surrounding of Vardzia on the upstream part of the river Kura is the only known locality for this species in Georgia. We succeeded in re-confirming its occurrence on 28vi03 by finding a few smaller specimens near a frequently used flight of steps close to the parking lot for visitors to the man-made cave complex of Vardzia, which dates from Georgians 'golden epoch', the 12th century.

D. nairensis, together with *D. valentini*, is

considered to be a parental species to the parthenogenetic *D. „unisexualis“* (UZZELL & DAREVSKY, 1975).

According to DAREVSKY (1967) the species name refers to Nairi, an older name for Armenia.

Males 72+131 mm (regenerated tail), females 72+92 mm (regenerated tail) (specimens in live collection HidB).

Darevskia parvula adjarica (Darevsky & Eiselt, 1980)

This species is singular among all *Darevskia* lizards in that it has a red belly, in females often confined to the outer ventrals. Some specimens have white bellies. The only subspecies found in Georgia is *D. p. adjarica*.

On 23vi03 we visited the valley of the river Akharistskali southeast of Batumi. Rain poured down continuously, but amazingly several lizards were to be seen. These were *D. p. adjarica* exclusively, which even in these weather conditions, with tempera-



The Akharistkali valley in the rain. Inset: female *Darevskia parvula adjarica*.

Photos: H.A.J. in den Bosch

tures around 15°C, went about their business. One female was very 'flat' and had probably just oviposited.

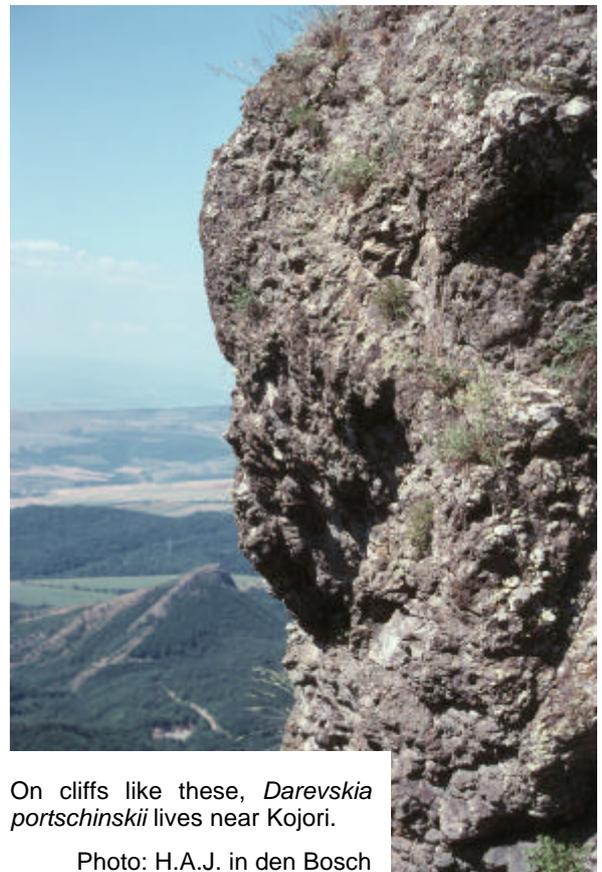
D. parvula clearly prefer vertical structures, be these rocky outcrops, trees or even clay-filled embankments.

Males 57+121 mm, females 57+113 mm.

Darevskia portschinskii (Kessler, 1878)

This elegant lizard is found in moderately open, drier rocky areas at middle altitudes. Its close relative, *D. „dahli“*, was found partly sharing its habitat near Kojori (alt. 1180-1340 m). We also found a number *D. portschinskii* on the rocky hillsides surrounding the 'Turtle Lake' a favourite recreation area of the inhabitants of the capital of Georgia, just above Tbilisi (650-800 m). In the morning hours we observed *D. portschinskii* basking and hunting (flies and caterpillars being a preferred prey item at that moment) on the less well-vegetated rocky cliffs.

Males 59+122 mm, females 60+102 mm (regenerated tail).



On cliffs like these, *Darevskia portschinskii* lives near Kojori.

Photo: H.A.J. in den Bosch



Male *Darevskia portschinskii* with Tbilisi as backdrop.

Photo: H.A.J. in den Bosch



D. rudis bischoffi, top, female, bottom, male.

Photos: H.A.J. in den Bosch

Darevskia rudis bischoffi (Böhme & Budack, 1977)

Where it occurs, *D. rudis* is usually found in large numbers (BÖHME & BISCHOFF, 1984). Primarily a rock species, it also lives on talus, man-made walls, ruins, along road sides and even in meadows provided some rocks, tree trunks or dilapidated buildings are present. With a total length of 250 mm, and a head-body length of maximally 86.5 mm, *D. r. bischoffi* is the largest rock lizard. It lives in the coastal regions of Achara and in the northeast of Turkey.

Darevskia rudis macromaculata (Darevsky, 1967)

While *D. rudis*, like the majority of rock lizards usually prefers slightly moist habitats, the subspecies *D. r. macromaculata* proved to be the exception to the rule. It lives in a moderately restricted area on the upper Kura. We found it on 28vi03 in a bone-dry, little side valley east of Rustavi (alt. 1020 m). The sympatrically living *Lacerta media* and *Laudakia caucasia*, characteristic of the steppe in Georgia, underlined this different ecological inclination by their very presence. Our observation of many smaller young lizards, apparently born in the preceding year but still immature at the end of June, was remarkable. Terrarium experiences with other *D. rudis* subspecies by HidB have shown that these animals are commonly full-grown in early summer and reproductively active in their first year. The population structure of the other Georgian subspecies, *D. r. bischoffi*, underlined this.

Males 61+130 mm, females 55+114 mm.

Darevskia valentini (Boettger, 1892)

On 28+29vi03 we noticed several egg-bearing females in Akhalkalaki, as well as a few that had ostensibly a short time ago oviposited along the high-rising banks of the river Paravani. *D. „armeniaca“* occurred sympatrically and were more numerous (see: Lizard communities). Some *D. „armeniaca“* even had bite marks from overzealous *D. valentini* males. Approximately 2 km NW of Akhalkalaki we found the species at an altitude of 1630 m, which is lower than has been reported, until now, in the literature: according to EISELT et al. (1992) the species lives at altitudes of 1700-3000 m. Quite soon thereafter, travelling northwest, the humid aspect of the landscape vanished and so did *D. valentini*. Just within a few kilometres we saw the first *Laudakia caucasia* and *Lacerta media*.

MURPHY et al. (1996) and FU et al. (1997) published on allozymes and mitochondrial DNA research of various rock lizards and among other conclusions they reported that

D. rudis and *D. valentini* were closely related. This was surprising to us; their finding might be connected to the fact that they only used two samples, one from Georgia and one from Armenia. While these are neighbouring countries, the localities the samples were collected from were far apart. To date we have collected lizards of both species from localities much closer to each other in order to eventually verify the above-indicated judgements, both genetically and morphologically.
 Males 72+143 mm, females 72+125 mm.



West of Akhalkalaki the scenery quickly changes from lush green to arid grey where *Darevskia valentini* cannot live.

Photo: H.A.J. in den Bosch



Habitat of *Darevskia valentini* along the Paravani river. Inset: top left a copulation, head male, bottom right male and female.

Photos: H.A.J. in den Bosch, W. Bischoff (copulation)

LIZARD COMMUNITIES

In many areas in Georgia two or more lizard species occur sympatrically. Sometimes a clear niche differentiation exists, sometimes the grouping is more puzzling.

One recurring phenomenon was manifest rather quickly. Where *Laudakia caucasia* occurred we also found *Lacerta media*. The reverse was not true. Sympatric with *Laudakia caucasia* we found *D. nairensis*, *D. portschinskii*, *D. rudis macromaculata*, and *Pseudopus a. apodus*, but not as a recurring assemblage of species. Below we will discuss several examples of species combinations that repeatedly presented themselves.

herpetological attention to them; amazing, as the obvious question is to what extent they would show a zoogeographical relationship to either the Greater or Lesser Caucasus range. Despite the poor weather and absence of proper roads we decided to investigate one of the larger hills Urta (max. alt. 469 m), near Chamiskuri at altitudes between 180-320 m. We found *L. agilis grusinica*, *A. f. colchicus*, and also *D. derjugini abchasica*, the latter basking on dead twigs in a more open spot in the forest during a rare moment of sunshine. The find of *D. d. abchasica* was exciting, as it undoubtedly indicates a biogeographical connection with the Greater Caucasus.

The differences in size, as well as the



Habitat of *Darevskia rudis macromaculata* near Rustavi. Insets: young male, head female and a side valley.

Photos: H.A.J. in den Bosch

Lacerta agilis grusinica Peters, 1960), *Darevskia derjugini abchasica* (Bischoff, 1982), *Anguis fragilis colchicus* (Nordmann, 1840)

Though the Colchis is mainly a lowland area with elevations commonly less than 50 m, there are several hills, which to us seemed islands in this flat landscape. As far as we know, nobody had ever paid any

habitat segregation, with the large *Lacerta agilis grusinica* living among the shrubs in the drier areas and on the edges of the patchy woodland, the much smaller *D. derjugini* in the woods hunting much tinier prey, and *A. fragilis* obviously exploiting an completely different subterranean niche, make such a lizard community simple to understand in ecological terms.



View from the hill Urta (bottom right: as seen from the Colchis). Inset: male *Anguis fragilis colchicus* and male *Darevskia derjugini abchasica*.

Photos: H.A.J. in den Bosch, W. Bischoff (*D. derjugini*)

Darevskia „armeniaca“ (Méhely, 1909),
Darevskia rudis obscura (Bedriaga, 1886)

In this assemblage the larger *D. rudis obscura* is obviously dominant but it may be less well adjusted to higher altitudes (max. 1900 m in Georgia) than *D. „armeniaca“*, which is evidently more adapted to mountainous areas. For example, on the road from Borjomi to Bakuriani *D. „armeniaca“* is not found below 1350 m. Her niche is then apparently occupied by *D. parvula adjarica* and *D. mixta*. Just like *D. rudis*, the less saxicolous *D. d. derjugini* is encountered here at all altitudes, but in much lower numbers.

In general it is noteworthy that the often much larger and robust *D. rudis* apparently live in peaceful co-existence with their smaller congeners. Apart from the aforementioned case with *D. „armeniaca“*, we detected sympatric occurrence with *D. brauneri*, *D. clarkorum*, *D. derjugini*, *D. mixta* and *D. parvula*.

Darevskia „armeniaca“ (Méhely, 1909),
Darevskia valentini (Boettger, 1892)

We found these two species sympatrically in and near Akhalkalaki. *D. valentini*



Among the *Darevskia „armeniaca“* a female *Darevskia derjugini* (bottom right).

Photo: W. Bischoff

seemed to be much more careful, one is even tempted to say "shy", than the sympatric *D. „armeniaca“*, but they are found on exactly the same rocks and in the same cracks in the habitat along the Paravani River south of the town (alt. 1800 m). *D. valentini* seems rare in this locale: only about one percent of the lizards belonged to this species. In the second locality we visited there, north of the town (alt. 1650 m), which was considerably wetter with water dripping down the rocks, *D. valentini* was much more abundant than *D. „armeniaca“* indicating that the former prefer moister and more shaded habitats.

D. „armeniaca“ is the generalist in higher altitudes to which a few rocks suffice, while the larger *D. valentini* is more saxicolous and favours a higher humidity in the environment. In Georgia *D. valentini* meets *D. „armeniaca“* only on the border of its range. *D. „armeniaca“* has a much larger distribu-



Left:

Male *Darevskia rudis obscura* near Akhaldaba.

Below:

Female *Darevskia rudis obscura* along the road from Borjomi to Bakuriani.

Photos : H.A.J. in den Bosch



tion in Georgia, while the main territory of *D. valentini* lies in Armenia and northeastern Turkey.

Darevskia „dahli“ (Darevsky, 1957), *Darevskia portschinskii* (Kessler, 1878)

Near Kojori we found these two species mixed, i.e. at a slightly higher location (1300-1340 m) on rocky escarpments we found a population consisting purely of *D. portschinskii*, but a little lower (approx. 1180

m) on a rocky plateau along a rivulet we found a clear mixture of both forms. In this latter population *D. „dahli“* was considerably more numerous than *D. portschinskii* (a ratio of 10-15:1) After some initial indecision we decided it was possible to distinguish *D. portschinskii* based on their grey brown, more matte dorsal colouring; the backs of the *D. „dahli“* showed a greenish, more shiny tinge. As yet the morphological differences seem minute.



The area along the Kojori rivulet is the habitat of mainly *Darevskia „dahli“*, although some *Darevskia portschinskii* can also be found there. Inset: a female *Darevskia „dahli“* that obviously recently oviposited.

Photos: H.A.J. in den Bosch

As we found only one *D. „dahli“* population, it is too early to remark on possible underlying mechanisms that preserve this lizard community. And as *D. portschinskii* is one of the parent species of *D. „dahli“*, reasonably similar habitat requirements should not be too surprising.

Darevskia clarkorum (Darevsky & Vedmederja, 1977), *Darevskia derjugini barani* (Bischoff, 1982), *Darevskia rudis bischoffi* (Böhme & Budak, 1977)

This assemblage is found in the Charnali valley near the Black Sea. The saxicolous *D. clarkorum* is clearly a specialist with a restricted range (SCHMIDTLER et al., 2002) that prefers a humid habitat. *D. derjugini* is also found in moister surroundings. However, it is largely ground-dwelling and found over a wide geographical area. The comparatively less-demanding *D. rudis* is also widely distributed.



The wet mountain meadows near Bakuriani are strikingly pastoral.

Photo: H.A.J. in den Bosch

Darevskia mixta (Méhely, 1909), *Darevskia parvula* (Lantz & Cyrén, 1913), *Darevskia rudis* (Bedriaga, 1886)

The Georgian endemic of *D. mixta* has a small range; the other two – *D. parvula* and *D. rudis* – occur in a much wider area, in fact *D. rudis* has the largest distribution of all *Darevskia* species. This species combination was found in Akhaldaba and the Banishkhevi valley.

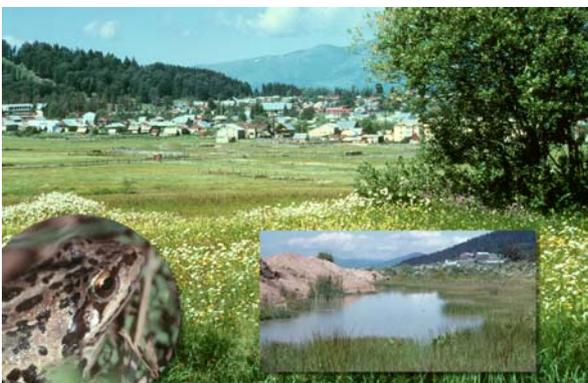
DISCUSSION

Reproduction

Oviposition of many lizards evidently occurs at the end of June in Georgia, quite independent of altitudinal distribution. Terrarium observations will reveal more details on number of eggs, number of ovipositions/year, and data on hatchlings (In den Bosch, in prep.).

Distribution

The only two *Darevskia* species that occur in both the Greater Caucasus as well as in the Lesser Caucasus are *D. derjugini* and *D. rudis*. Both species probably originated in the Lesser Caucasus, perhaps in the western parts, the Meskheta range, because only there is their distribution almost continuous. From there *D. rudis* colonised its present Turkish area of distribution and, by way of the Suram Mountains (also known as Lichis Kedi or Likhi range) that link the Lesser and Greater Caucasus, parts of the latter mountain chain. Maybe *D. rudis* succeeded because she is ecologically more flexible than most other species. As is quite clear in the field, *D. rudis* is capable of living syntopically with the smaller *Darevskia* species all over Georgia. However, where *D. rudis* encounters the larger members of its genus, like *D. brauneri* in Svaneti in the western part of Georgia, or *D. cf. valentini* in the eastern Pontus Mountains, its dispersal ends. For *D. derjugini*, primarily a ground-dwelling lizard not restricted to rocky structures, the Colchis lowlands form no barrier.



The surroundings of Bakuriani are an amphibian paradise. Inset: *Rana macrocnemis*, and a pool next to a building site in which we observed *Triturus vittatus ophryticus* and *Triturus vulgaris lantzi*.

Photos: H.A.J. in den Bosch

Because it occupies a different ecological niche than most other species, it flourishes in suitable habitats almost anywhere.

It remains noteworthy that parthenogenetic lizards are only found in the Lesser Caucasus and not in the Greater Caucasus.

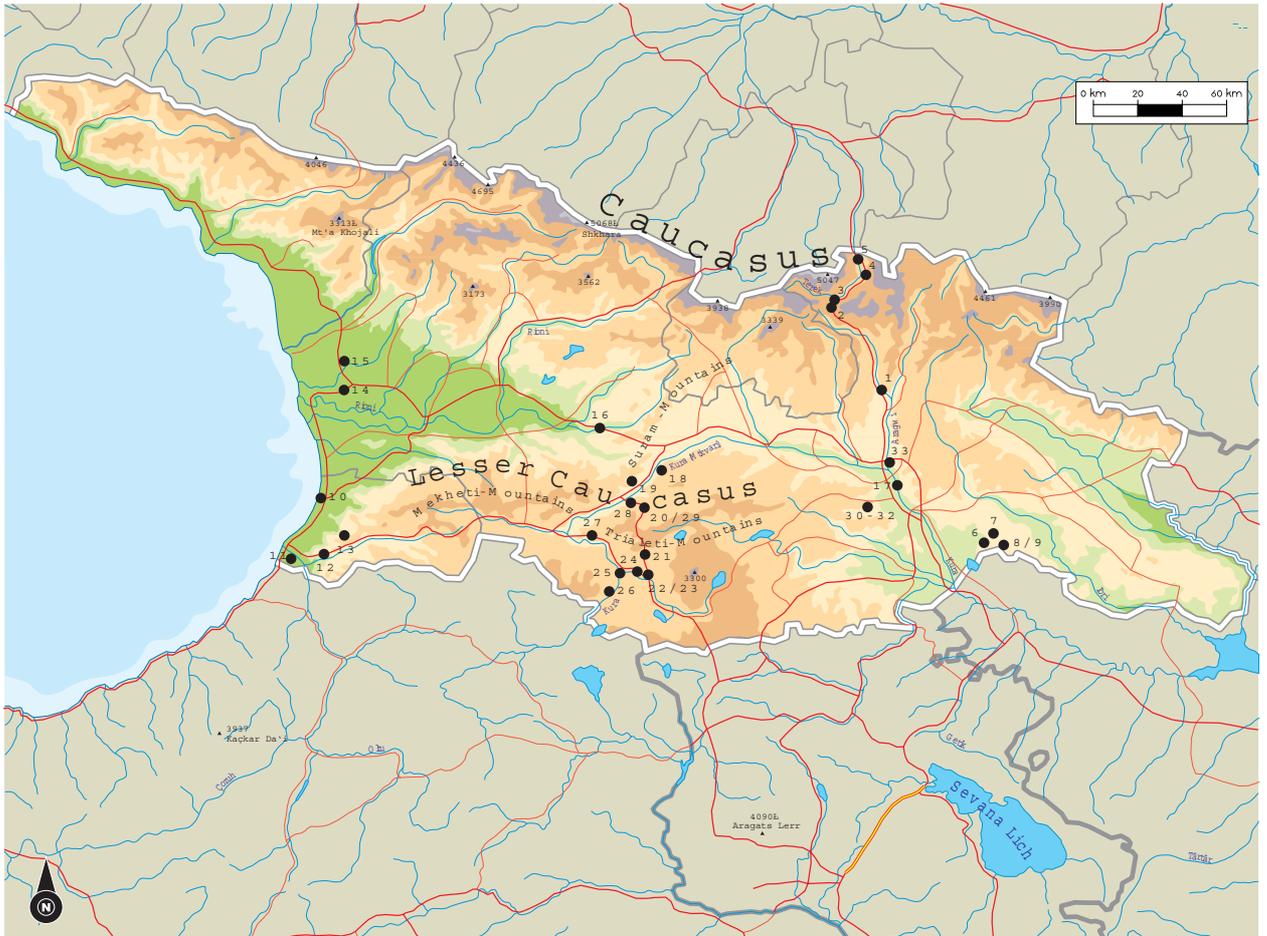
Lizard communities

In the examples presented above, most apparently stable species communities can probably be explained either by niche segregation (*L. a. grusinica* + *D. d. abchasica* + *A. f. colchicus*; *D. clarkorum* + *D. d. barani* + *D. rudis bischoffi*), slightly different micro-ecological requirements of the members (*D. „armeniaca“* + *D. valentini*; possibly *D. „dahl“* + *D. portschinskii*), or an overlap at the edges of the area of distribution of the forms where suboptimal conditions may hinder the dominance of the constituting forms of the assemblage (*D. „armeniaca“* + *D. r. obscura*; *D. mixta* + *D. parvula* + *D. rudis*).

Still, it was amazing to find several lizard species living in the same habitat, sometimes even on exactly the same rock, without noticeable interspecific interference. If there had been major morphological differences, a dissimilar diurnal rhythm, dietary preferences or any other clear distinguishing characteristics between the constituting species this would not have been so surprising. And even when there was such an element (e.g. *D. rudis* being the largest of the species involved) no aggressive or competitive encounters were witnessed. The pattern that emerged was one of communities comprised of one or more generalist species and a specialist species, and/or in the area of sympatry at least one species was at the edge of its (geographical or ecological) range. Apparently food, shelter and other prerequisites are not primarily limiting resources for the existence of these lacertid communities in Georgia.

ACKNOWLEDGEMENTS

We are grateful to David Tarkhnishvili and his wife Rusja Mamradse for their unsurpassed hospitality in Tbilisi. Our driver Sacha Goderidse managed the most impossible roads, or did without infrastructure, and amazingly never lost his patience. We thank Andreas Mendt for the map.



Map: A. Mendt and W. Bischoff

Table 1: Localities where species were found in Georgia.

Nr	Datum	Locality	Altitude	Habitat	Species
1	19.06	Ananuri	750 m	walls of church ruins, shrubby surroundings	<i>Darevskia rudis chechenica</i> <i>Lacerta strigata</i>
2	19.06	Pass of the Cross (Jvari Pass)	2395 m	pools	<i>Bufo viridis</i> (larvae) <i>Rana macrocnemis</i>
3	19.06	above Kobi	2050 m	talus	<i>Darevskia c. caucasica</i>
4	19.06	northern city limits Kazbegi	1725 m	talus	<i>Darevskia c. caucasica</i>
5	19.06	Dariali Gorge, 10 km north Kazbegi	1350 m	rocky road side	<i>Darevskia c. caucasica</i>
6	20.06	6 km west Davit Gareja	765 m	steppe	<i>Testudo graeca ibera</i>
7	20.06	2 km southwest Udabno	750 m	temporary pools in steppe	<i>Pelobates syriacus</i> (larvae) <i>Bufo viridis</i> <i>Rana ridibunda</i>
8	20.06	surroundings of monastery Davit Gareja	650 m	walls and shrubby dry meadows	<i>Testudo graeca ibera</i> <i>Laudakia caucasica</i> <i>Lacerta m. media</i> <i>Pseudopus apodus</i>

9	20.06	near monastery Davit Gareja	500 m	dry valley with sparse steppe vegetation	<i>Eremias velox caucasia</i> <i>Lacerta strigata</i> <i>Eirenis collaris</i> <i>Telescopus fallax iberus</i>
10	22.06	northern city limits von Kobuleti	10 m	public garden and overgrown dry rockwalls	<i>Lacerta agilis grusinica</i>
11	22.06	Charnali valley	50-150 m	rocky brook and its wooded banks	<i>Bufo verrucosissimus</i> <i>Rana ridibunda</i> <i>Darevskia clarkorum</i> <i>Darevskia derjugini barani</i> <i>Darevskia rudis bischoffi</i> <i>Anguis fragilis colchicus</i> <i>Zamenis longissimus</i>
12	23.06	Zvare, 2 km north Keda	170 m	rocky road side in the Adcharishchali valley	<i>Darevskia parvula adjarica</i> <i>Anguis fragilis colchicus</i> <i>Tyria n. najadum</i> <i>Rana ridibunda</i>
13	23.06	Chwana	500 m	rocky roadside	<i>Darevskia parvula adjarica</i>
14	24.06	6 km southwest Teklati	30 m	shrubby meadow	<i>Lacerta agilis grusinica</i>
15	24.06	Mt. Urta near Chamiskuri	180-320 m	shrubby meadow on karst	<i>Hyla arborea schelkownikowi</i> <i>Lacerta agilis grusinica</i> <i>Darevskia derjugini abchasica</i> <i>Anguis fragilis colchicus</i>
16	24.06	Skhrocha (Suram Mts.)	225 m	river banks	<i>Natrix tessellata</i>
17	25.06	Tbilisi, Turtle Lake	660-800 m	shrubby hillside with exposed cliffs	<i>Laudakia caucasia</i> <i>Lacerta m. media</i> <i>Darevskia p. portschinskii</i> <i>Eirenis modestus</i> (<i>Macrovipera lebetina obtusa?</i>)
18	26.06 27.06	Achaldaba	900 m	forest meadows and cliffs	<i>Bufo verrucosissimus</i> <i>Darevskia d. derjugini</i> <i>Darevskia mixta</i> <i>Darevskia rudis obscura</i> <i>Anguis fragilis colchicus</i> <i>Coronella austriaca</i>
19	26.06	Banishkhevi valley	850 m	rocky road side and grounds sawmill	<i>Darevskia d. derjugini</i> <i>Darevskia mixta</i> <i>Darevskia rudis obscura</i>
20	27.06	3 km southwest Bakuriani	1900 m	roadside	<i>Darevskia „armeniaca“</i> <i>Darevskia d. derjugini</i>
21	27.06	Javakheti plateau, approx. 5 km south Tskhra-Tskaro Pass	2200 m	escarpments in mountain steppe	<i>Darevskia „armeniaca“</i>
22	27. u. 28.06	Choslio near Akhalkalaki	1800 m	precipitous rocky west bank of the river Paravani	<i>Rana macrocnemis camerani</i> <i>Darevskia „armeniaca“</i> <i>Darevskia valentini</i>

23	28.06	northern city limits Akhalkalaki	1650 m	cliff-like road side	<i>Rana macrocnemis camerani</i> <i>Darevskia „armeniaca“</i> <i>Darevskia valentini</i>
24	28.06	2 km northwest Akhalkalaki	1630 m	cliff-like road side	<i>Darevskia valentini</i> <i>Darevskia „armeniaca“</i>
25	28.06	southeast Chertvisi	1200 m	cliffs in steppe	<i>Laudakia caucasia</i> <i>Lacerta m. media</i>
26	28.06	Vardsia	1230 m	rocky, vegetated wetlands bordering the Kura	<i>Rana macrocnemis camerani</i> <i>Rana ridibunda</i> <i>Laudakia caucasia</i> <i>Lacerta m. media</i> <i>Darevskia nairensis</i>
27	28.06	2 km east Rustavi	1020 m	dry, rocky little valley	<i>Rana ridibunda</i> <i>Laudakia caucasia</i> <i>Lacerta m. media</i> <i>Darevskia rudis</i> <i>macromaculata</i>
28	29.06	road Borjomi- Bakuriani	1350-1550 m	cliff-like road side	<i>Darevskia d. derjugini</i> <i>Darevskia rudis obscura</i>
29	29.06	Bakuriani	1700 m	wet mountain meadows	<i>Triturus vittatus ophryticus</i> <i>Triturus vulgaris lantzi</i> (and larvae) <i>Bufo viridis</i> (and larvae) <i>Rana macrocnemis</i> <i>Rana ridibunda</i> <i>Darevskia d. derjugini</i>
30	30.06	Kojori	1340 m	cliff face	<i>Darevskia p. portschinskii</i>
31	30.06	Kojori	1220 m	shrubby forest meadow	<i>Lacerta m. media</i>
32	30.06	Kojori	1180 m	talus leading to banks Kojori brook	<i>Bufo viridis</i> <i>Rana ridibunda</i> <i>Darevskia „dahlī“</i> <i>Darevskia p. portschinskii</i>
33	30.06	Mtskheta, Church of the Cross (Jvari)	700 m	mountain steppe with shrubs	<i>Pseudopus apodus</i>

LITERATURE

We divided the literature into two sections: the literature cited in this paper, and a general section on what has been published on the herpetology of the Caucasian Republic of Georgia. We presume the latter synopsis might be helpful to Dutch and English speaking readers as most papers concerning this area have been issued in either German or Russian.

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