

A Primary Survey of Lizards At

Jabal El-Arab (south of Syria)

Almasri, A.

History of the Studies

Studies of this area started by the botanic scientists who visited the area at the end of the 19th century and the beginning of the current century, and this occurred after the traffic routes had improved, which allowed for the coming of more tourists. Jabal El - Arab was mentioned once in Flora Orientals (Boissoer 1875) when referring to *vederianella*, Dr. George post, of the Syrian Protestant College in Beirut (now the American University of Beirut), had studied the plants of this area through the specimens he preserved in his herbarium in Beirut, this trip was in September 1875. After eleven years post, with one of his colleagues (a zoologiste and one of his students, studied all the eastern borders of the area between Bosra and Shahba during the period 7-12 May 1886. After 1919, and strictly speaking, between the Two World Wars, it became easier for tourists and foreigners to enter Jabal El Arab and to visit the archeological sites regularly and in a more reduced way for the Syrians, Lebanese, Palestinians and the foreigners who are living in Beirut, Damascus or Jerusalem.

In April 13, 1951 a group of students from the Syrian Damascus University, headed by their professors Mr. Henri Pabot, made a

large botanic trip to Jabal El Arab- Shahba area- and they returned at the end of June of the same year.

It seems that this visit was the first Scientific visit to the area aiming for a joint Zoological-Botanic study. Although a number of complete Syrian studies for some zoological groups were previously carried out. Boettger started in 1878 to study Herpetofauna of Syria, and he compiled his results in 1880 under the title of: The Herpetofauna of Syria, Palestine and Cyprus. Regarding the Syrian Fauna in general Mr. Henri de Kerville made a zoological trip in Syria in 1908, and a number of Zoological Scientists had benefited from this trip as Boulenger (1923) wrote about the Syrian Herpetofauna.

In this area there are fauna and flora which are distinctive from those in the surrounding area due to the different climate and the geographical isolation caused by the high mountain which is 1803 m. above sea level in Tal Gnaieh,, also due to the volcanic nature of the area in Allajat and Al safa that gives the area a specific nature.

Some people consider that it is possible to find some endemic species which are remnants of the ice age and they remained due to the geographical isolation since then a large number of scientists came to study fauna in Syria, but no complete work was done and the Zoological aspect of Jabal El Arab was done in general neglected due to the rough and difficult traffic routes in the past. Now and after the elapse of 114 years from the first

study we didn't achieve a lot and we still have a great responsibility regarding Herpetofauna in the area.

Location:

Al Suwaida governorate represent the south -eastern part of Syria with an acreage of 7.000 sq.k.m. connected from the north with Al sham Ghouta, from the east with Al sham sami-desert, and from the west and the south with Hauran and Jordan. The population is about 250.000 inhabitant. It is distinctive for at least three environmental systems, which are. The mountainous area with high rain-fall average, the western planes area with medium rain-fall average, and the eastern area with very little rain-fall, due to the direction of the wind bearing the rain from the Mediterranean sea, and this gives the area of Jabal El - Arab a specific importance as it is the only mountain that has a relatively wet climate in the Syrian Semi-desert area. The population density at the eastern area is very little due to its location within the semi-desert or Al Hamad area. The cultivation flourishes in the western plane and it started recently to spread to the Southern area after the project for the development of the southern area.

Jabal El Arab is a volcanic block located between Hauran plate and the Syrian Desert almost between 32°20-33 Latitude to the north and 36°20-37°10 longitude to the east. Before the Second World War the whole area was within the territories of the

S.A.R. but the far south (um AI Jimal) is now within the Jordanian territories.

The geological Environment:

The area was formed as a result of modern volcanoes out bursts. Different volcanic elevation shapes appeared. The average altitude of Jabal El-Arab is more than 1 000 m. and the highest peak in Tal Gnaieh, which is more than 1800 m. The shape of elevations differs largely due to the sequence of volcanic blocks from different ages, and also due to their separation by a number of valleys where water flows during the wet seasons of the year. These valleys slope towards the west to a basaltic elevation of a medium height (700-900m) of which Wadi Al-Yarmouk is the most important valley. The elevation is delineated by Jordan valley and Tabarya Lake from the west, elevating towards the foot of Jabal Al-Sheikh (Mt. Hermon) in the western north, and separated from the southern Palmyride by Damascus depression. There were strong volcanic outbursts at the end of Paleocene, particularly in Jabal EL Arab and ALGolan and the tectonic movements, that generated the mountains, ended and elevation took almost the current shapes.

The Soil:

There are three tapes of soil in the area: Terra Rosa, the brown soil which is a mixture of red and volcanic soil, and the mere

red soil. All these types are rich and good for cultivation. According to ACSAD Table of the soils in Syria we notice that in Al Suwaida area there are Mediterranean fractured clay soils, shallow Mediterranean undeveloped soils, Mediterranean soils of little development, and dark soils relatively rich with Mediterranean organic matters of fine texture and medium sloping. The eastern area of Al Suwaida distinctive for its typical limy soils which has medium texture bare rocks and shallow undeveloped soils. The west southern area has limy fractured and little developed soils of clay soils. The northwestern area has bare rocks and little developed Mediterranean Limy fractured soils of fine texture and little sloping.

The northeastern area has bare rocks and undeveloped dry shallow soils of medium texture and light sloping.

The annual average of rainfall ranges from 150 Mm to more than 500 Mm, while the continental ranges according to Jourzenski, between 45% and 30%. The climate environment ranges between very arid and semi humid according to formula.

The Historical Environment:

The inhabitants of Jabal El Arab depends on cultivation such as vanguard, wheat, lentils, beans, apricot and almonds, and the area is famous for the cultivation of grapes.

This fact is indicated in the statues of wine Gods in the cultivation of during the Roman rule, which had recently encouraged some companies of soft drinks to build factories in the area like "The Mountain Co."

The cultivation of apples and olives had lately developed, particularly in the mountainous areas, and the cultivation of apples in particular, due to its high economical revenues after the development project of the southern area that aimed for stone removal and the reclamation of land in the high mountainous areas. Plants and animals kept almost their original state due to the lack of grazing in the area, in spite of the large wood-cut movement that occurred at the beginning of century during the first world war.

The agricultural character is dominating in the area the recent project is assisting in the destruction of the creatures natural environmental and this would threaten them if they did not a place to hide.

Till now the oak trees cut not as wood but to be replaced by tree cultivation in these areas.

Geographically the area was known Jabal Hawran, the old age as Jabal Bashan and the Arabic Literature as Jabal Al Rayan.

Recently it is named Jabal Al Durouz and lately it is Jabal El Arab. The area was historically inhabited, and it is considered as one of the oldest ancient East areas for the pre-historical mankind domicile. A number of human waves of old Arabs like the Amoriles, Arameans, Nebateans and, followed by the Moslem Arabs. Also at different periods different waves had succeeded like the Greeks. Bezantines and Romans, and each wave left their antiquities which are spreading all over the Governorate like the antiquities of Nebateans, and antiquities of the Greek Roman, Ayoubis epochs and others. Wherever you dig in the mountain you will find antiquities and this fact refer that the area which used to enjoy a more moderate climate than now which encouraged for the establishment of stable civilisations.

The Geo-morphology of Jabal El Arab:

The elevations of Jabal El Arab form a natural appearance for the different volcanic shapes where modern and relatively older volcanic cones are noticed (Map 1).

The average mountain altitude is 1 000 M. and the highest peak is 1803M. in Lujaina location, which is located in the main block of Jabal El Arab. The shapes of elevations differ largely due to the volcanic blocks, which are of different ages. We may refer here that the last volcanic outbursts occurred at the Quaternary. In general the mountains form one huge block

consisting of a number of old volcanic cones that emerge strongly on the hills and volcanic planes surface. The block becomes lower by removing from its central part and transforms into a hill 700-900M high.

This topographical dissimilarity reflexes the existence of climate influence of the current construction of the environmental systems in Jabal El Arab.

The Climate Elements in Jabal El Arab:

The area under study is, like other Syrian territories, located under the influence of moderate Mediterranean climate, where topographical changes reinforce the climate changes, particularly those related to the quantities of rain fall and the average of temperature. Also the influence of the geographical location, as the mountain is facing the gap which is formed between the end of the anti-Lebanon series, the south-west of Syria, and the beginning of Al Jaleel mountain series in the north of Palestine forming Tabarya plane. This gap allows the Mediterranean air current to pass and the effects reach Jabal El Arab.

Through the General Directorate of Meteorology I could acquire the climate data of some climate stations distributed in southern Syria (Table 1).

I concluded the following:

The difference in the annual rain fall average in the area under research; ranging from 535 mm Ain Al Arab station (1510 m above sea level) to 225 mm in Sawara station(790 m above sea level) to the north of our location.

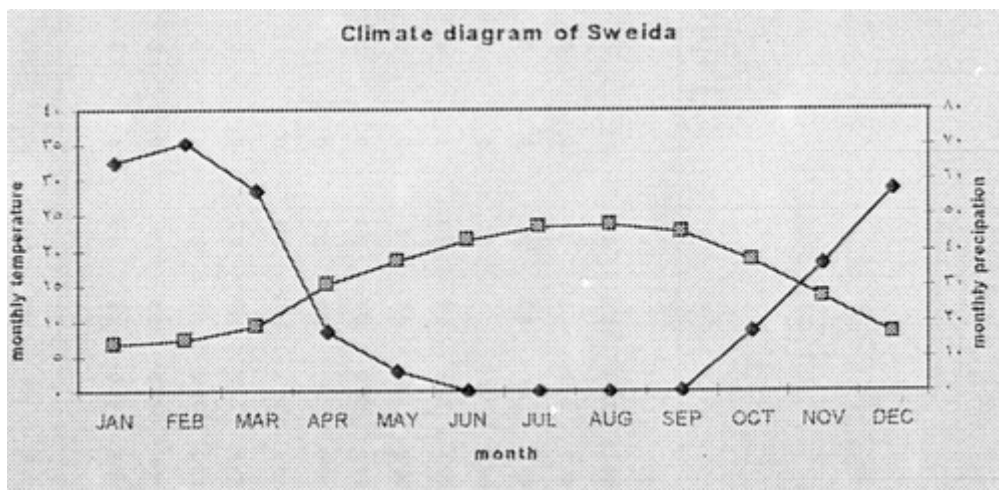
- The annual temperature average is ranging between 29.9 in Ain Al Arab, to 33.6 in Tal Shihab station.
- According to Emberget bio climatic factor, the area has a semi-humid cool to dry moderate climate ($Q = 33-65 \text{ m} = -1.5 - 3.3$)
- Rain seasonal distribution in all stations of winter, spring, autumn and summer types.

Climate divisions in Jabal El Arab according to Motaird:

- The sea Mediterranean climate: It is an area that generally receives more than 700 mm of rain, and it is humid in summer, almost without frost in winter and relatively high from the west side to the mountain.
- The continental Mediterranean climate: it is an area of less rain than the a.m. area, the atmosphere is dry and there are hard changes during summer. It exists in Albikaa plain south of Baalbak and the neighboring slopes in particular

- The mountain climate and the suitable vegetation.
- The Syrian climate (desert tendency): with week rainfall but usually reaching 250 mm, that would allow some non - irrigated crops.
- The desert climate: with less than 250 mm rain fall that would not allow irrigated crops.

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Station	Monthly precipitin (mm)												Total	Period	Elevation		Temperature	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			M	m	M	m
	Sawara	41.3	49.4	40.2	15.4	2.9	0.1	0	0	0.1	7.9	25.3			34.7	217.3	1965 - 96	790
Rudaima	41.9	57.1	49	18.9	5.2	0	0	0	0.5	8.7	26	29.8	237.1	1973 - 90	*	-	-	
Nimra	48.1	59.6	52.1	16.4	3.2	0.5	0	0	3.2	9.6	32.1	32.6	257	1975 - 97	*	3.3	-	
Suwaida	77.8	69.6	57.8	23.8	5.6	0.3	0	0	2.4	13.9	31.8	58.3	341	1958 - 97	997	-1.5	31	
Ain alarab	111.9	110.2	88.3	36.7	14.3	0.8	0	0.1	1.7	23	55.5	96.1	538.6	1963 - 94	1510	-	26.9	
Sali	64	88.8	55.4	15	3.8	0.5	0	0	1.1	9.7	40	47.4	326	1973 - 97	1540	-	-	
Orman	90.9	103.9	80.2	20.5	8.2	0.1	0	0	2.9	13.1	41.7	71.3	432.8	1973 - 96	*	-	-	
Amtan	43.7	55	39.3	13	4.2	0	0	0	1.1	6.2	20.2	44.2	229	1959 - 97	1260	-	-	
Salkhad	73.5	35.2	65.2	20.5	7.4	1.1	T	0	0.6	9.8	31.6	69	313.9	1959 - 94	1447	-1.5	29.2	
Omrwak	94.1	141.9	96.2	33		0.3	0	0	1.2	5.5	49.4	93.4	522	1973 - 96	*	-	-	
Mshannaf	66.3	77.8	66.2	26	5.8	0	0	0	0.9	12.1	25.3	53.5	333.9	1965 - 96	1500	-	-	
Shrehi	43.5	64.6	49.3	11.9	1.7	0	0	0	0	5.2	21.8	34.7	232.7	1973 - 92	*	-	-	
Rshedeh	19.8	59.9	44.7	20.1	4.7	0.1	0.1	0	0.2	9.2	23.7	42.9	225	1959 - 90	1400	-	-	

Table (1)

The Botanic Environment:

The *Quercus calliprinus* in the area are considered one of the few forests in Syria Mediterranean botanic cover in Jabal El Arab.

Faced destruction thousands years ago from the inhabitants who lived in the steppe and neighbouring areas, consequently parts of this track is now either bare of the Mediterranean plants or covered by a largely deteriorating botanic cover.

It is believed that in the past it was covered by eastern Mediterranean cover. As this track represent the stretching end of the Mediterranean it is quite difficult now to restore the botanic cover to its original nature after destruction. The *Quercus calliprinus* is considered as one of the most important elements in the southeastern parts of the Mediterranean basin, because it forms with a number of bushes and evergreen trees like in South Turkey, Syria, Lebanon and Palestine.

This species spread starting from 300 m. above sea level, except at the very deep levels where it starts at 100 m. above sea level. It grows on the red clay and sandy soil, and on some shapes of.

The minimum necessary average rain for the growth of *Quercus calliprinus* is about 350 mm., which is available in Jabal El Arab. Also in Jabal El Arab there is the steppe forest. This diversification gives the mountain the importance for studies in addition to the existents of water gatherings that carry in their folds integrated environmental systems although they are recent as dames like Al Rom. Dam.

The General features of fauna in Jabal El Arab:

The influence of the south Area development project is quite clear on the zoological biodiversity in the area, where most of the animals, after destroying their natural dwelling - the black volcanic rocks forming excellent dwelling and distinctive microclimates - they are obliged to move to the marginal lines, where the rocks are thrown, and consequently their numbers decrease terrifically, and some species that cannot adapt with the new environment would disappear. Animal species are distributed among the different groups: from which are considered rare, in general, in the area and particularly species of Limy nature which are found in the less high areas due to the rare, in general, in the area and particularly species of limestone in high areas and the nature of acidic volcanic soil.

There are many scorpion species, exceeding six species, wild bees, spiders, a number of few of fish exist due to the scarcity of lakes and water flows in general and most of them are relatively new.

Regarding the amphibians, four species are known now, and 26 species of reptiles.

There are large numbers of birds species: predators, water and domicile birds etc., in addition to the migrating species, in spite of the great dangers, they face due to the dense hunting, and you can notice in the steppe areas near the lakes the dense reminds of old and modern hunter bullets.

It seems that the fate of mammals is not much better than the birds as many species had disappeared like the gazelle and wild pig as a result of hunting. Some other species still exist like wolves, hyena, moles, some rodents, beavers and others.

In addition to new species resulting from cultivation and human activity.

The Influence of volcanic soils:

Neither limestone's nor any other sedimental rocks exist in Jabal El Arab, as is located within a wide and open volcanic domain.

The basalt form solid pieces, affected by erosion and covered by a shallow layer of soil, or they might be bare. In other places basalt is fragmented rocks deposited like ashes, where we have fertile deep soil and the winter wheat cultivation flourish in addition to other crops.

In general there are two kinds of volcanic soils in the area, the oldest appear here and there in the mountainous areas within the Anti-Lebanon series, and such places are preferable to farmers due to their fertility. As for the original flora, which are near the sandy soils, it seems to be poor. The second kind is quite different from the first and found in the soils of volcanic origin that cover large acreages of red to violet soils such soils are found separately in Syria (upper Al Jazira, Al Markab Citadel) and they spread largely in Al waer area, on the road between

Tripoli and Homs, but the largest acreage is found in Jabal El Arab. The origin of these lands goes back to the Paleocene age (Quaternary). The absence of Silix of the Paleolithic of old stone age in Jabal El Arab, which is very rich with stone equipment that go to more modern ages recall to believe that at least part of its basalt appeared after the appearance of mankind.

The absence of some kinds is not limited to Jabal El Arab and Hauran only but was also noticed in Al waer area near Homs, and in return a group of botanic species which are adapted with volcanic regions. In addition to the volcanic soil characteristics the huge botanic volume of plants resulting from abundant nutrition would draw the attention.

Also some change of plants colours are noticed. It is worth mentioning here that as Jabal El Arab area is geographically isolated is considered as an area of species separation or the originating of some zoological species, for example *Laudakia Stella* (Reptilia: Agamidae) separates into 2 species in this area: *L.s. picea* and *L.s. stellio*. And we can not find intermediate forms between the two subspecies except in Jabal El Arab, also the black volcanic rocks are a defining factor for the spreading of some species that largely adapted its colour, for example the appearance of *Ptyodactylus puisexi* (Reptilia Gekkonidae) in colourful black with the same system of the volcanic rocks colours in Jabal El-Arab area.

The Influence of Human activities:

Like Hauran area and other horticulture of a secondary order, we mention some: lentils, beans, chick peas, in addition to other plants like vineyards, almonds, apricot, and some vegetables.

In spite of that apple cultivation is the most important at present regarding the acreage and the economic revenue, and for this sake traditional cultivation became or it is all most absolute and thousands of hectares of rocky lands, which way used, not along time ago, to be classified as lands of deteriorating forests, as the result of this increased agricultural investment the flora of the area was enriched with species accompanying such cultivation and they were used to be called harmful plants.

Jabal El-Arab is, like all areas in the middle east, facing strong wood cutting and chaotic flock grazing mainly goat grazing that caused very strong deteriorating and retreating of the natural botanic cover, particularly the forests which became, in most sectors, as separated trees gathering, and rarely as very separated trees we should not forget that agricultural exploitation manifestation and for this reason Mouterde as he mentioned in introduction to the Encyclopedia of Jabal El Arab plants, could not visit some locations due to their roughness "Sauf le Tell Chihane, tous ces terrains peu accessible, ou du mois ont été peu visites. Je n'ai pu personnellement atteindre".

The modern agricultural machines allowed for the vertical spreading of vineyards and apple on the hills peaks, that form the mountain block, occupying the forest type which Zohary in 1972 as "the forest steppe" and they may stretch during the coming years to the rest of slopes.

Results:

I have found 12 species in Jabal El Arab, which are *Hemidactylus turcicus*, *Ptyodactylus puiseuxi*, *Chamaelo chamaeleon recticrista*, *Laudakia stellio picea*, *Trapelus ruderata*, *Eumeces schneideri pavimentatus*, *Mabuya vittata*, *Ablepharus kitaibelii*, *Ophiomorus latastii*, *Ophisops elegance*, *Lacerta kulzeri*, *Acanthodactylus sp.* (Table 2). Four other species are known to this area, I could not find them, which are *Acanthodactylus shreiberi syriacus*, *Laudakia stellio stellio*, *Varanus griseus* and *Diplometopon zarudnyi*. I was informed by the local people that another species which is not known for this area does exist here (*Uromastix aegyptius microlepis*). I expect also in the future to find *Chalcides ocellatus*, *Pseudotrapelus sinaitus*, *Stenodactylus grandiceps*, *Acanthodactylus tristrami*, *Trapelus pallidus*.

The existence of *C. C recticrista* is almost linked with thick vegetation. I also have wide spreading and dense numbers of species, and the wide spreading is interpreted as such species are tolerant towards the environmental conditions like *O. elegance*.

L.S picea is linked with the volcanic areas with black rocks that suite its colours, but cannot adapt with the very arid areas and it is replaced by *T. ruderata*. I also noticed a decrease in the number of *L. stellio* as long as we ascend the western slope of the hill until it disappeared at the top.

H. turcicus may appear during the day when the temperature is low (Minton 1966). *H. turcicus* is unacceptable to the local people due to the belief of its relation with Leprosy, in spite of its high benefit in eating house insects. *P. puiseuxi* is a day active species and we noticed its existence in the areas of black volcanic rocks. It was seen in areas of yellow or light brown soil but gathered on the black stone, piles which the people gathered as in Al Kuswa area for example. Due to its colour adaptation it doesn't exist in places that do not have black volcanic rocks, it protects its eggs by clinging them in fractures or hiding them at the bottom of the rock with fixing that makes it difficult to pull out, otherwise it will be broken.

		Location
	<i>Gekkonidae</i>	
1	<i>Ptyodactylus puisexi</i>	Ira - nabeira- Assawara assogra- Aimgayer- Alanat- Tall gnaya- Hazm- Alhayat-Nabeira-
2	<i>Hemidactylus turcicus</i>	Slim
	<i>Chamaeleonidae</i>	
3	<i>Chamaeleo chamaeleon reticrista</i>	Assawara assogra
	<i>Agamidae</i>	
4	<i>Laudakia stellio picea</i>	Amtan- Nabeira- Rsbedeh- Sale- Alanat- Sadderom- Slim- Ira- Tall gnaya-Assawara assogra-
5	<i>Trapelus ruderata</i>	Assawara assogra- Rshedeh- Msamieh- Boedan- Alqaraa-
	<i>Lacertidae</i>	
6	<i>Ophisops elegans</i>	Salkhad- Ira- Slim- Talliloz- Mayamas- Sadderom- Rshedeh- Msamieh- Nabeira- Alanat- Alqaraa-
7	<i>Lacerta kulzeri</i>	Qanawat- Tallgnayeh- Slim-
8	<i>Acanthodactylus sp,</i>	Sadderom-
	<i>Scincidae</i>	
9	<i>Mabuya vittata</i>	Assawara assogra- Salkhad- Tall gnayeh- Alqaraa-
10	<i>Eumeces schneideri pavementatus</i>	Assawara assogra- Rimtellohf-
11	<i>Ablepharus kitaibeli</i>	Ira- Assweida-
12	<i>Ophiomorus latastii</i>	Assawara assogra-

Table (2)



Trapelus ruderata



Laudakia stellio picea



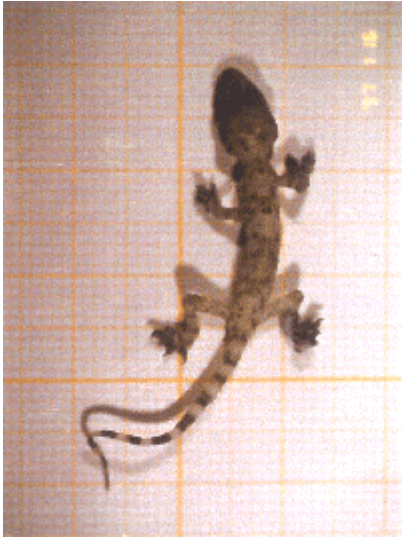
Ptyodactylus puiseuxi



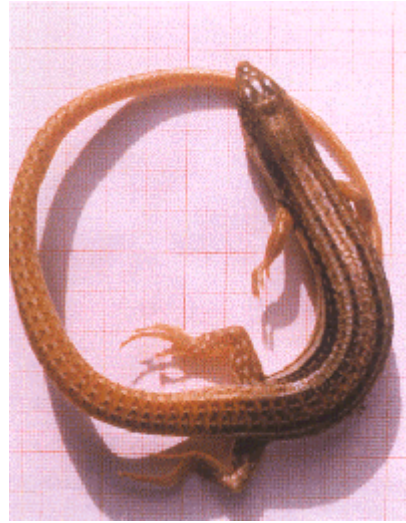
Acanthodactylus sp.



Ophiomorus latastii



Hemidactylus turcicus



Eumeces schneideri pavementatus



Ophisops elegans



Mabuya vittata



Chamaeleo chamaeleon recticrist



Lacerta kulzeri



Top region of Jabal El-Arab



Western region of Jabal El-Arab



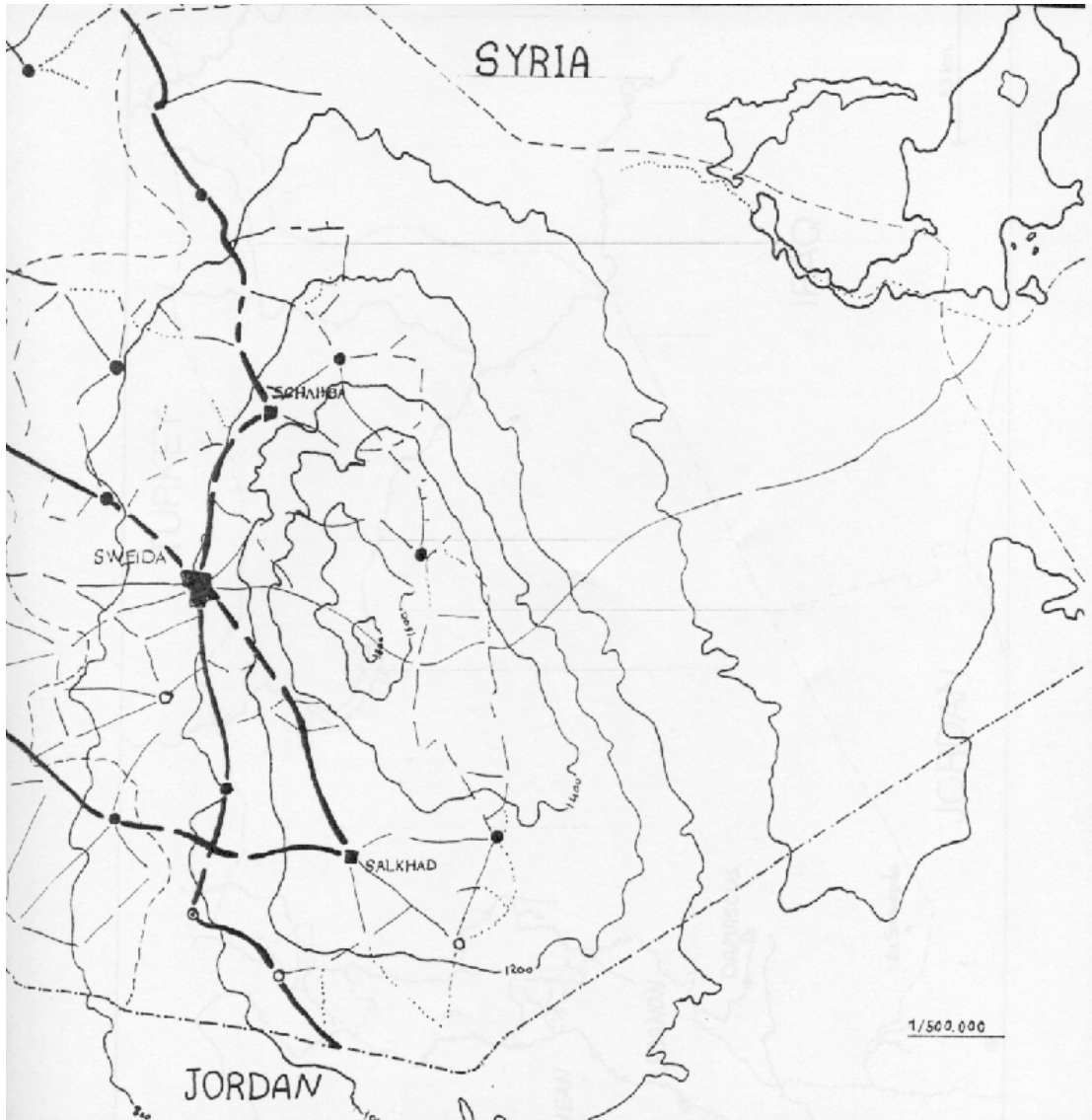
Eastern region of Jabal El-Arab



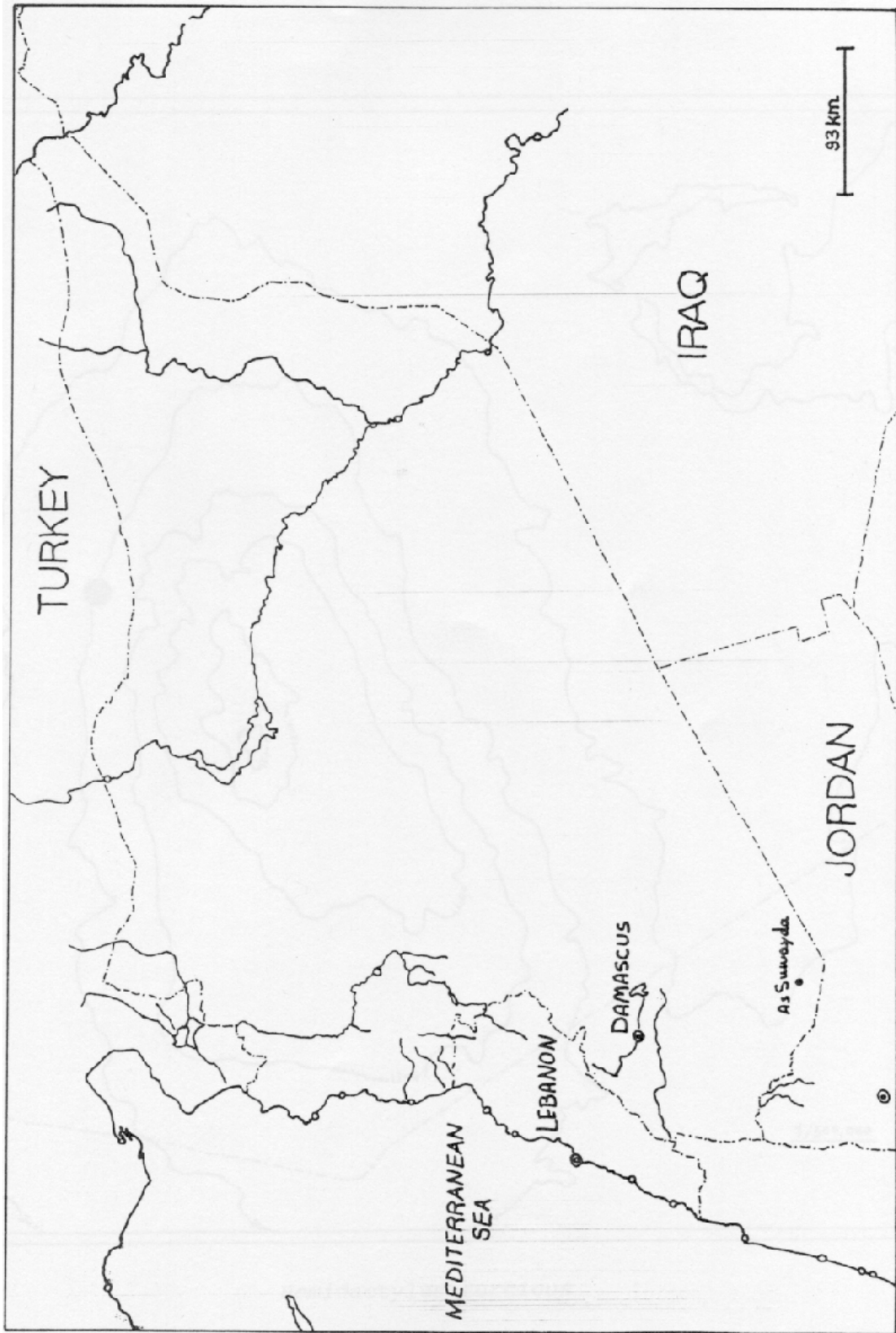
Northern region of Jabal El-Arab



Southern region of Jabal El-Arab



(Map 1)

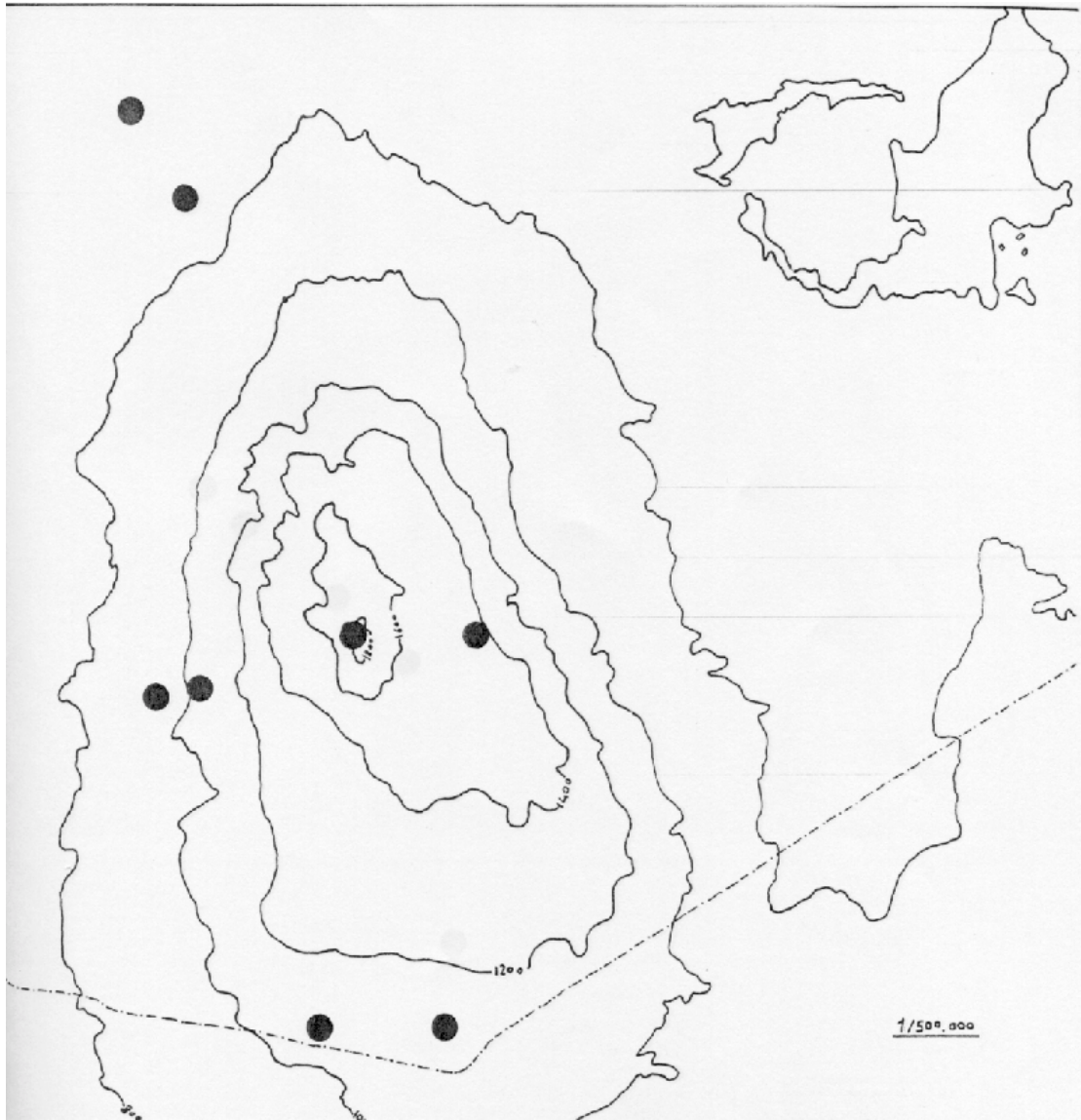


(Map 2)



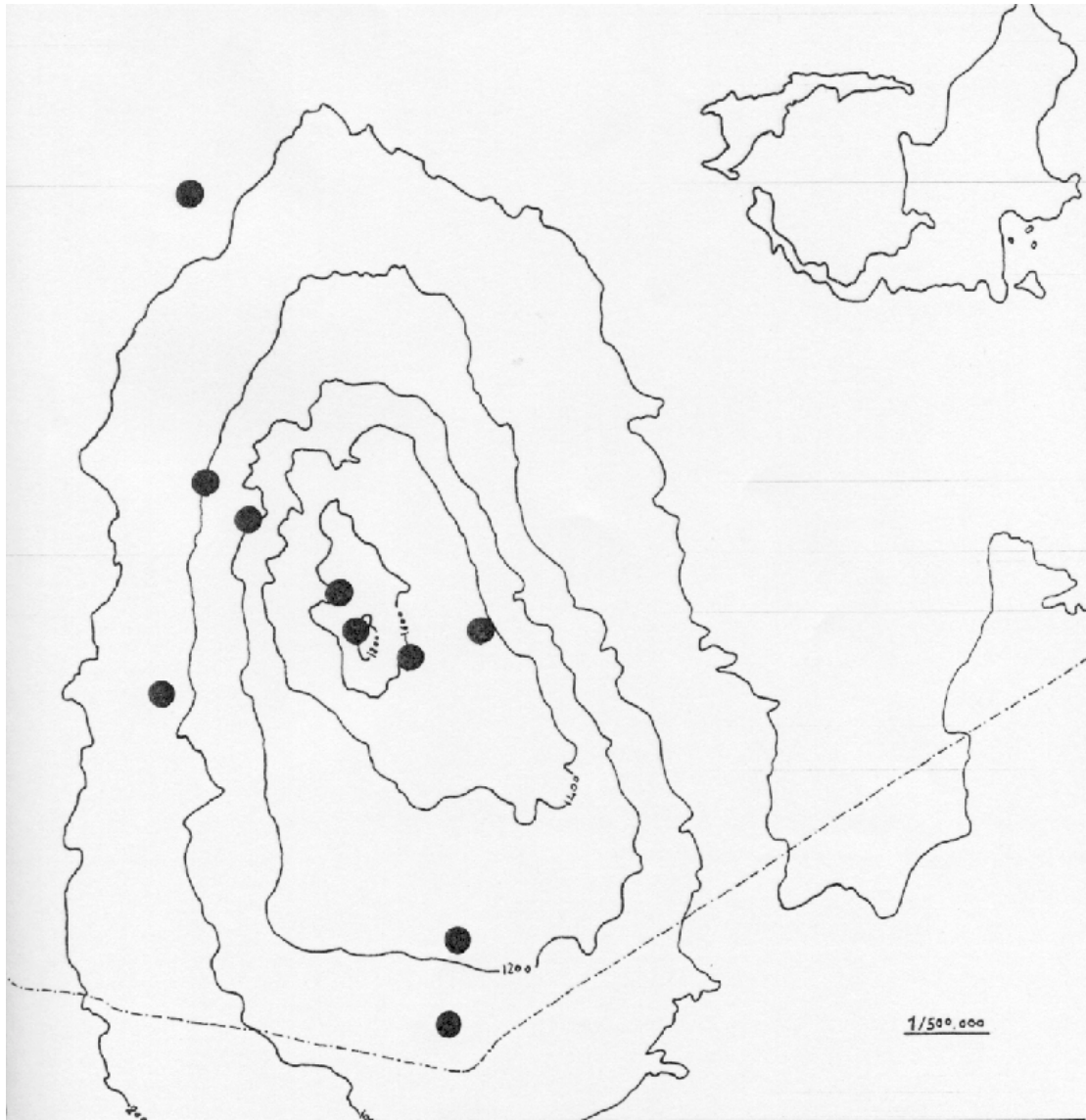
Hemidactylus turcicus

(Map 3)



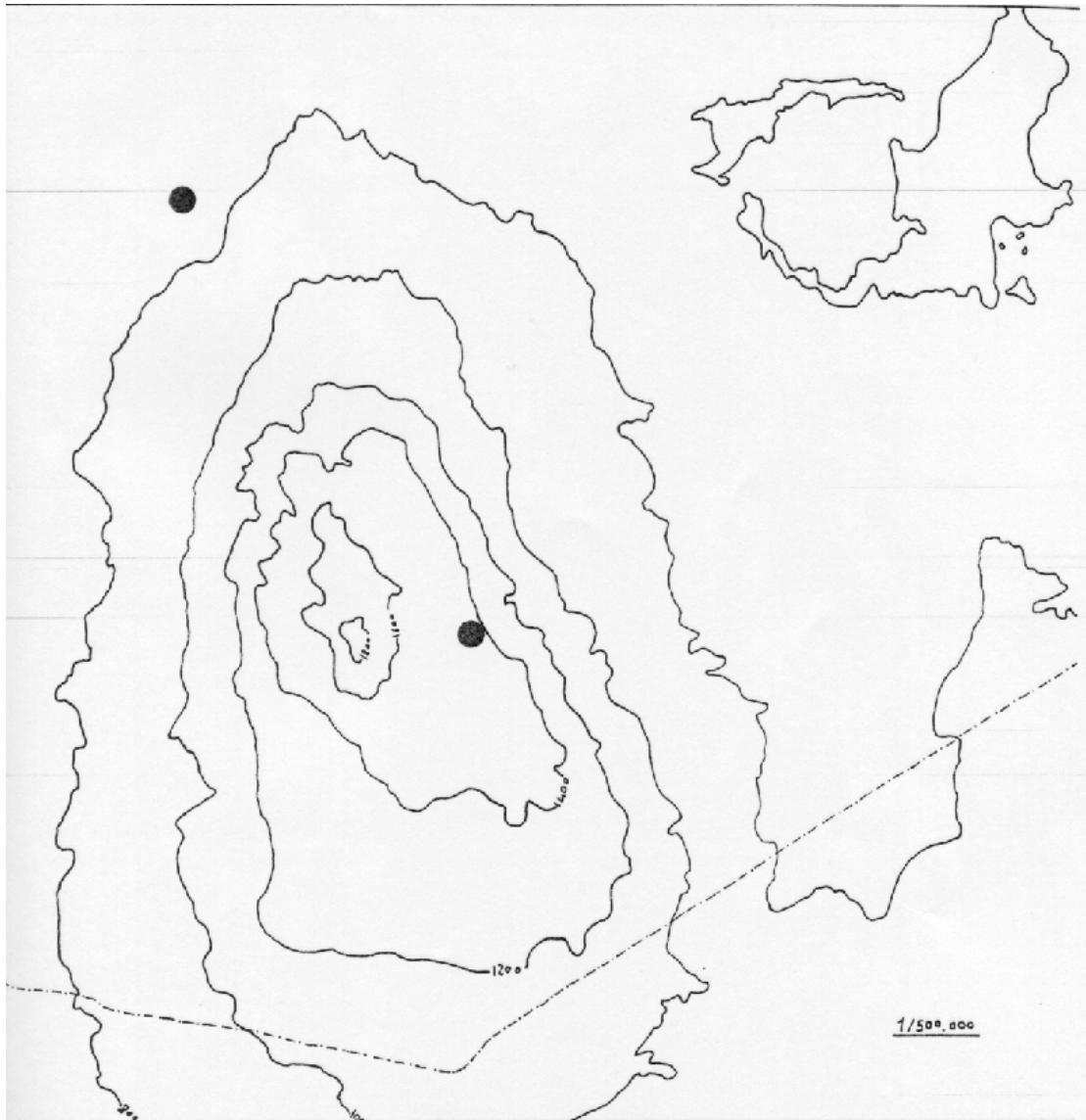
Ptyodactylus puiseuxi

(Map 4)



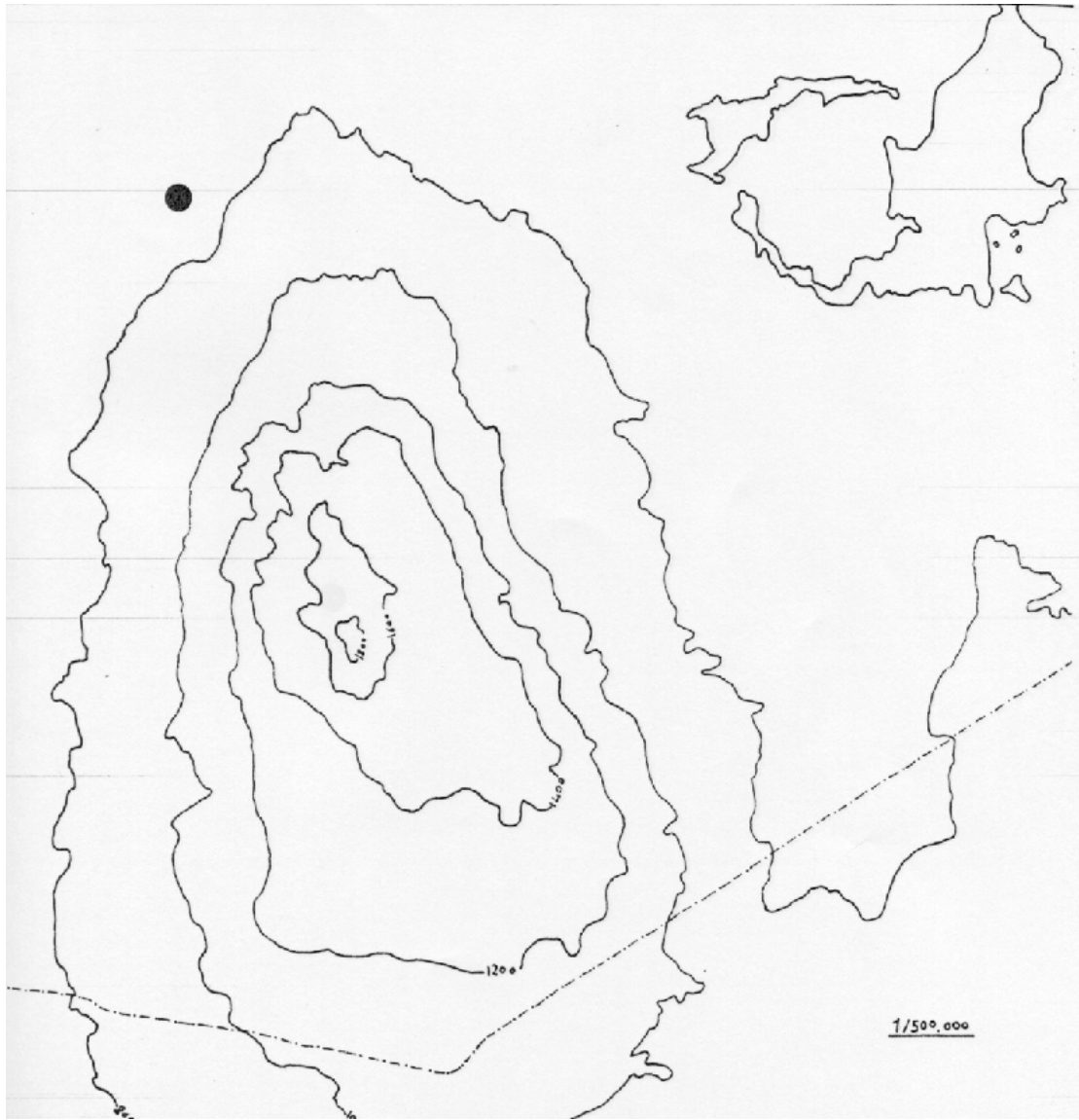
Laudakia stellio picea

(Map 5)



Trapelus ruderata

(Map 6)



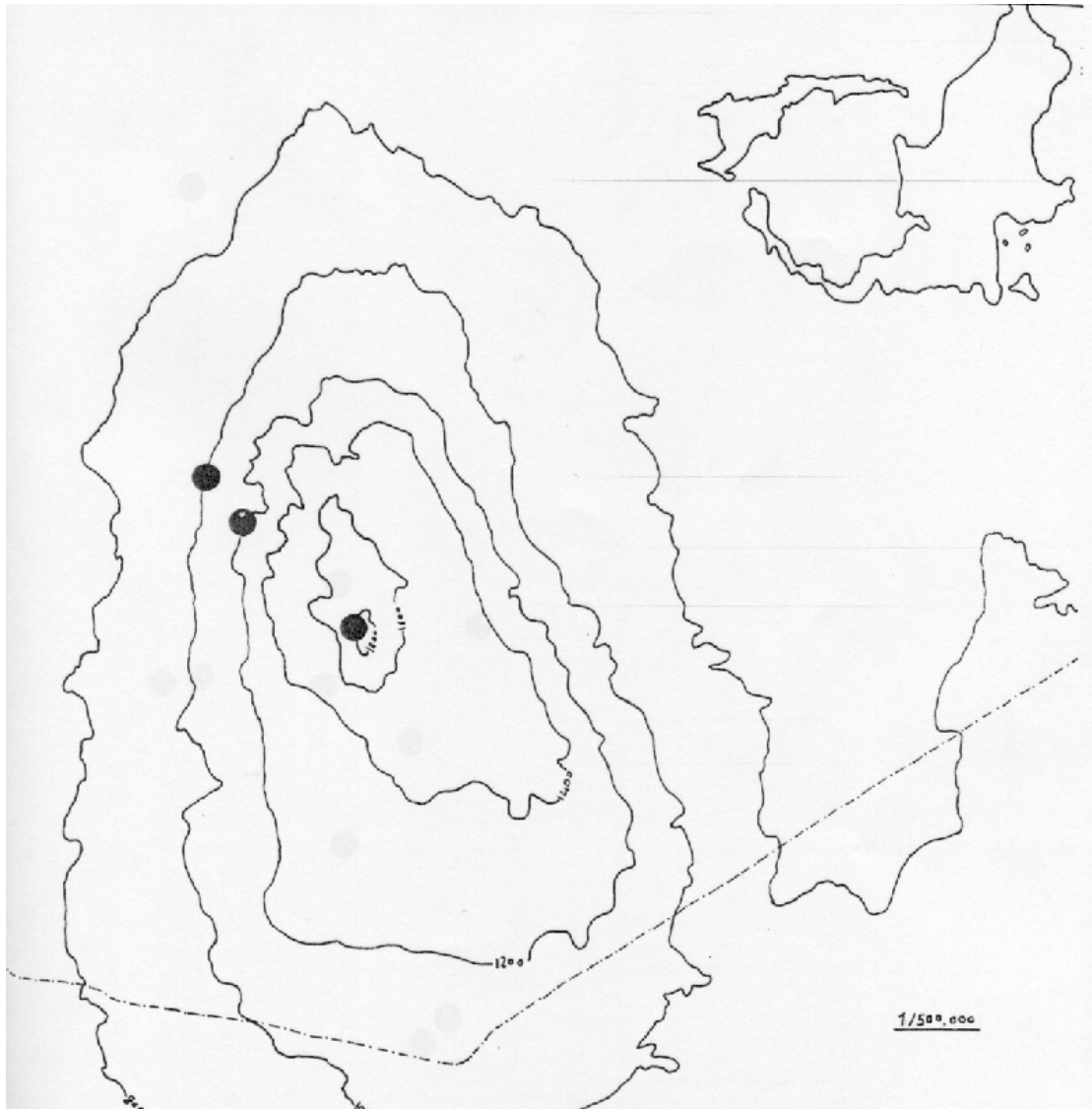
Chamaelo chamailion recticrista

(Map 7)



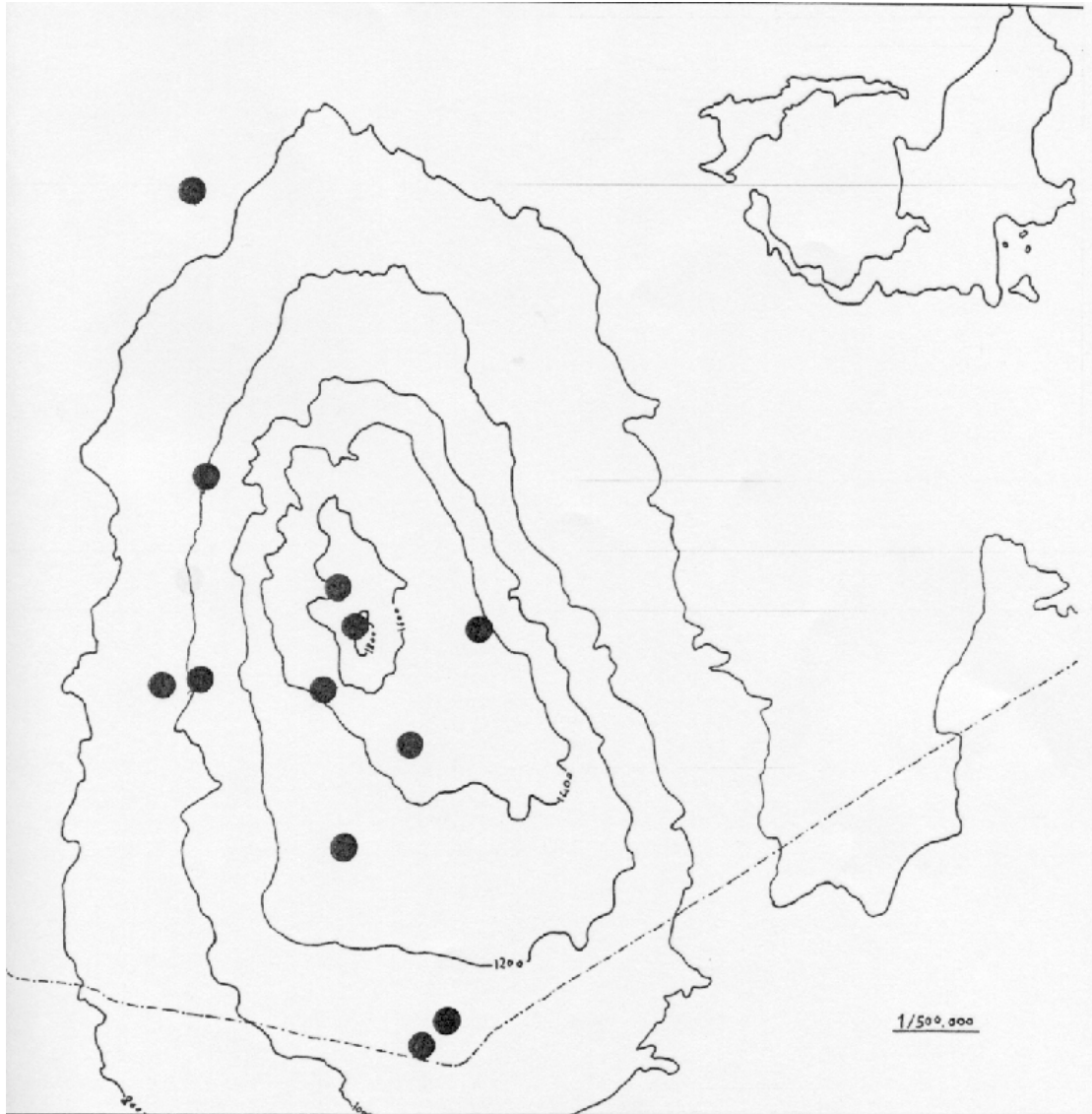
Acanthodactylus sp.

(Map 8)



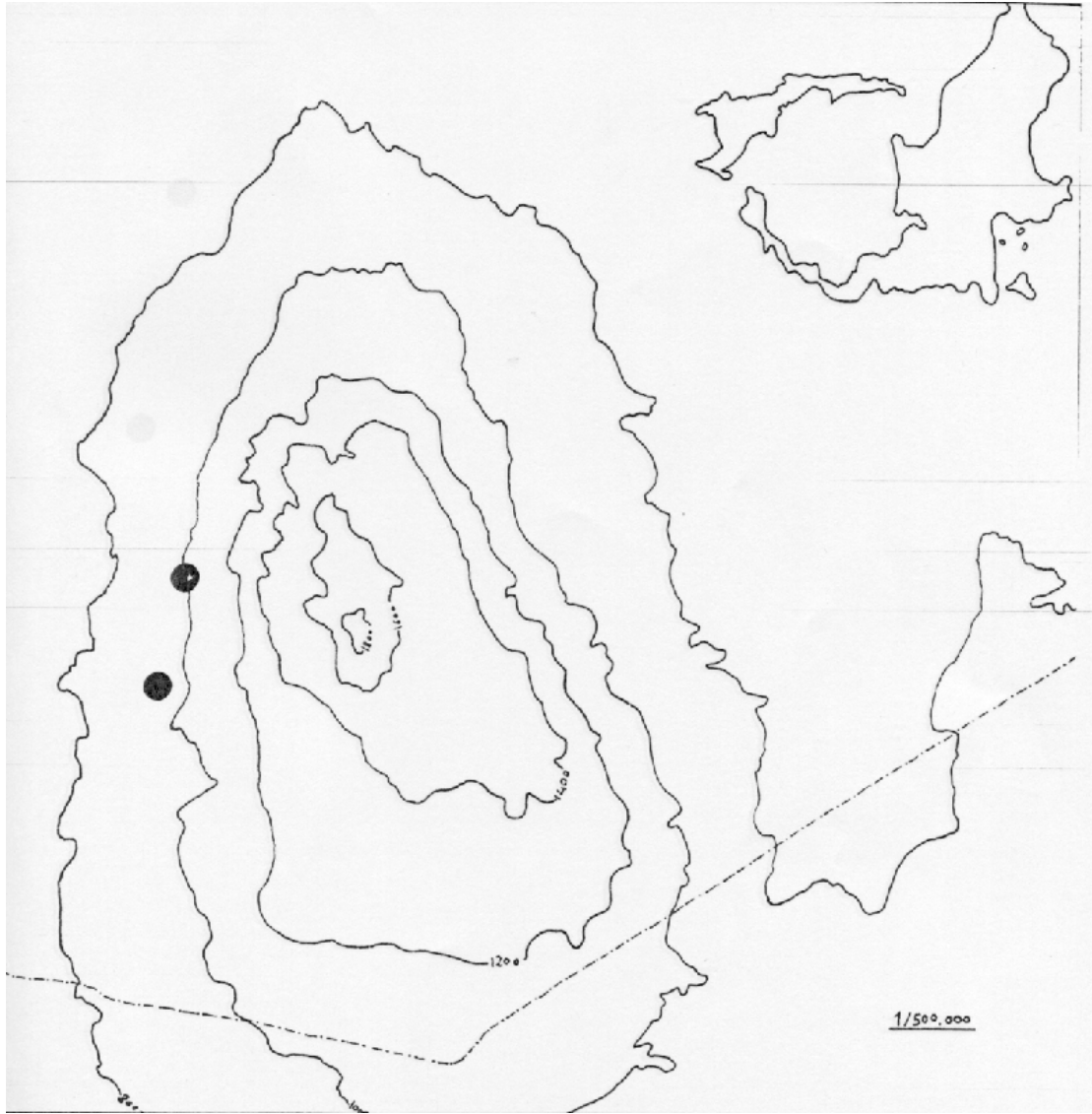
Lacerta kulzeri

(Map 9)



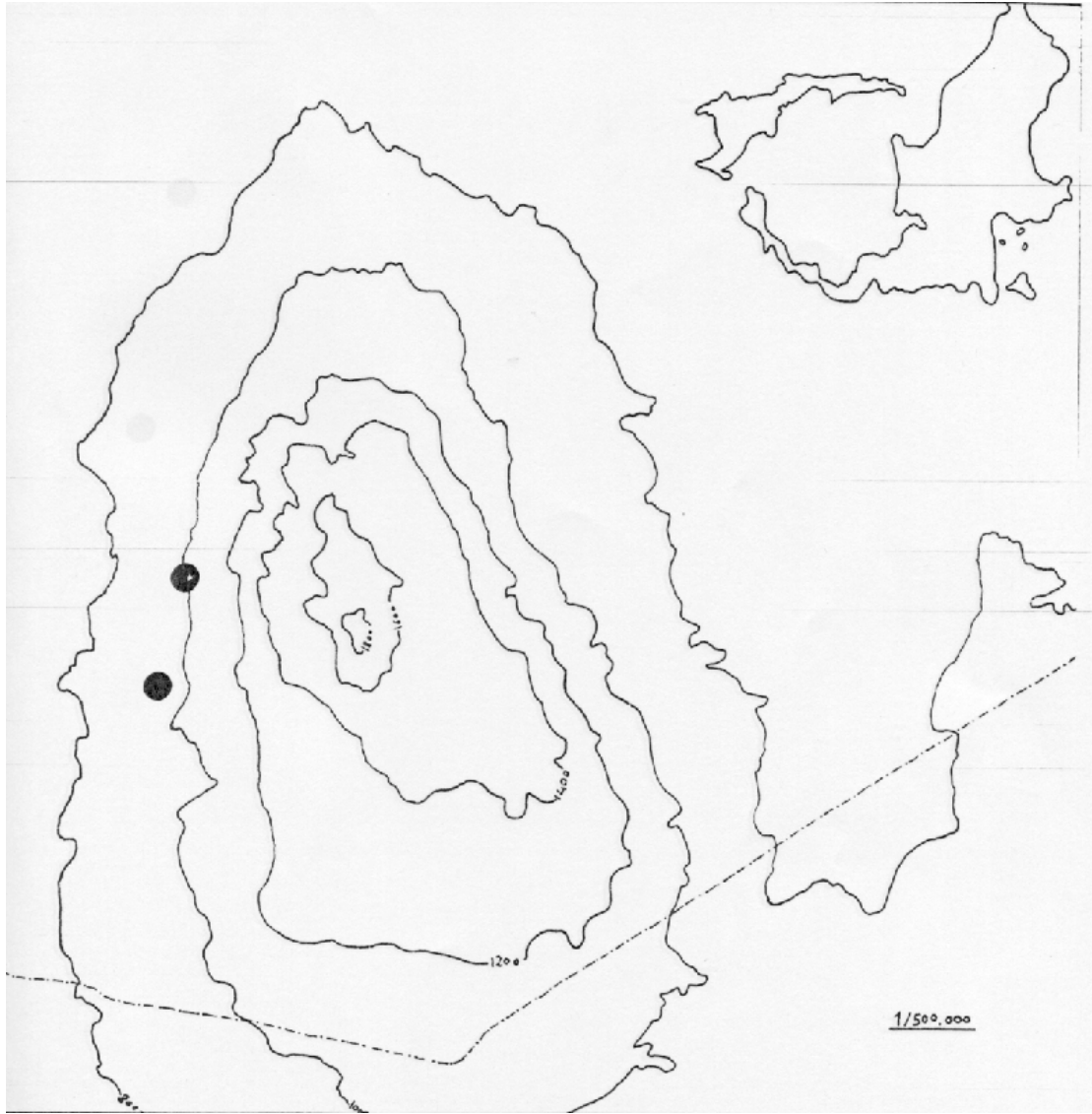
Ophisops elegans

(Map 10)



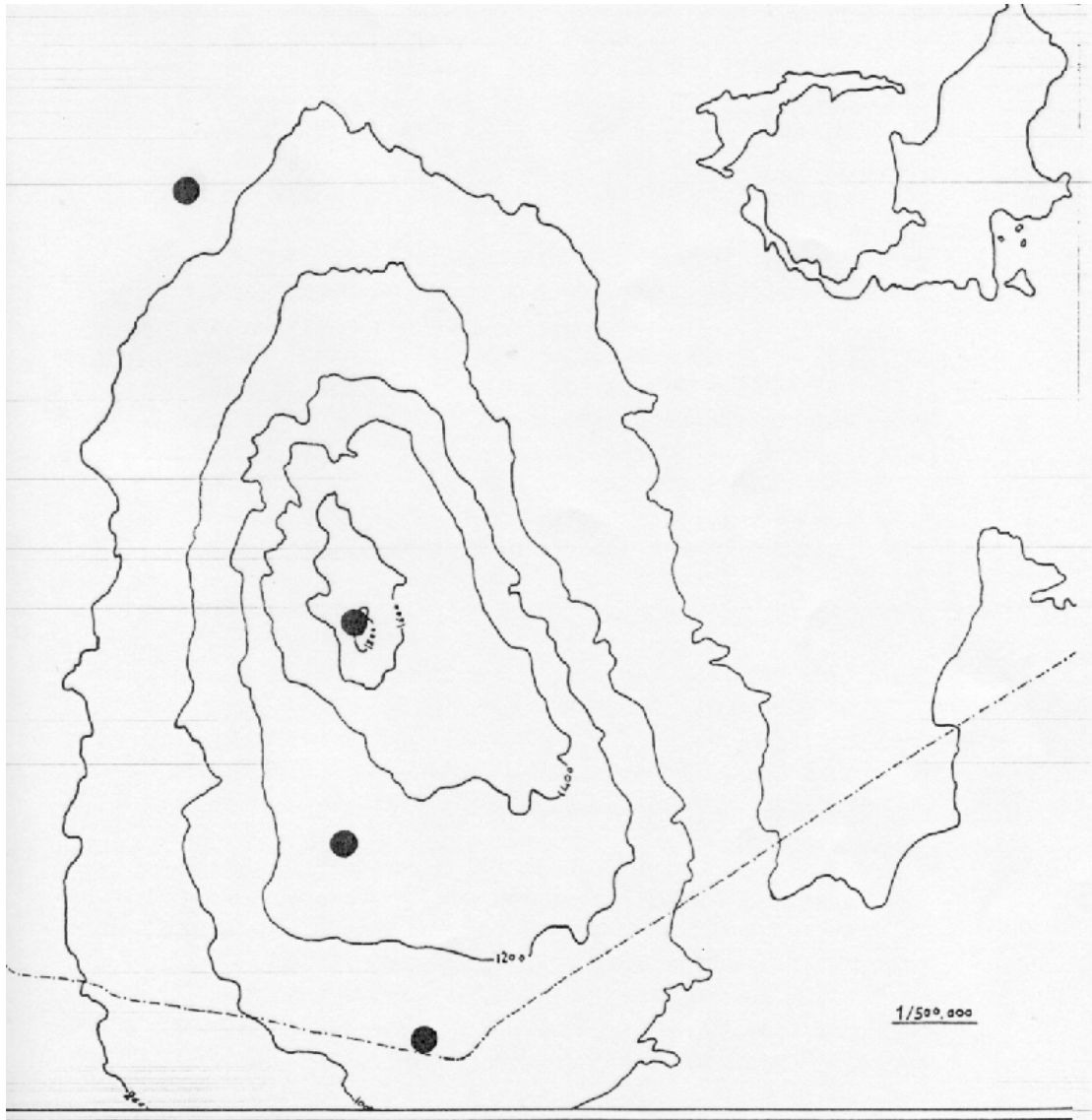
Ablepharus kitailbelii

(Map 11)



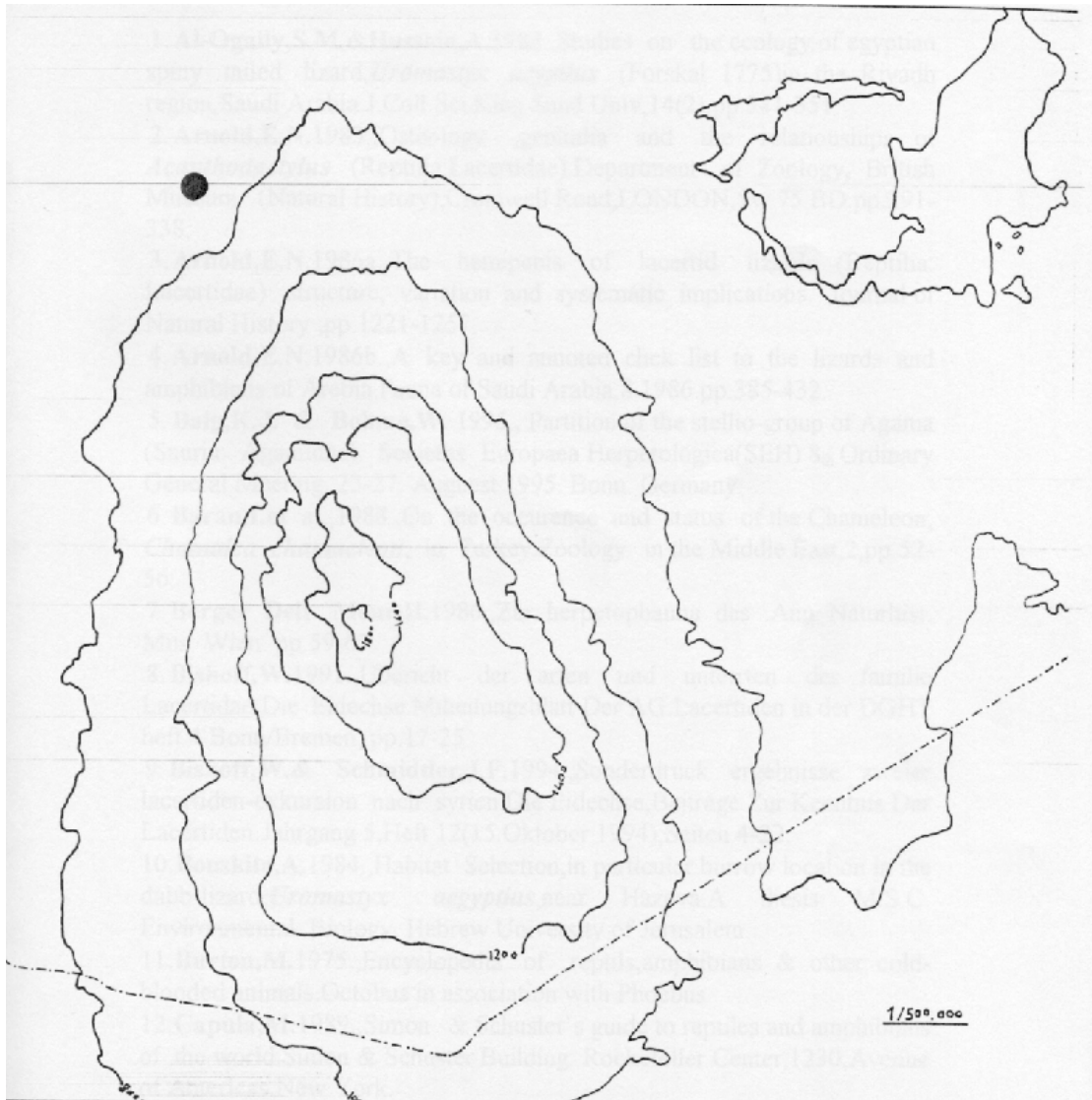
Ablepharus kitailbelii

(Map 11)



Mabuya vittata

(Map 13)



Ophiomorus latastii

(Map 14)

1. **Al-Ogaily, S.M. & Hussain, A.** 1983. Studies on the ecology of Egyptian spiny tailed lizard, *Uromastyx aegyptius* (Forskal 1775) in the Riyadh region, Saudi Arabia. J.Coll.Sci.King Saud Univ,14(2),pp.341-351.
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