Amphibia-Reptilia 3, 257–268 (November 25, 1982)

Amphibia-Reptilia

Lacerta siculimelitensis sp. n. (Sauria: Lacertidae), a giant lizard from the Late Pleistocene of Malta

Wolfgang Böhme and George Zammit-Maempel

Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 150–164, D–5300 Bonn 1, Federal Republic of Germany, and 53, Main Street, Birkirkara, Republic of Malta.

Abstract. *Lacerta siculimelitensis* sp. n., an extinct giant lizard species is described from the Late Pleistocene of Malta. It is shown that this species lived contemporaneously also on Sicily. The zoogeographical aspects of the fossil form as compared with recent members of the genus are discussed.

Zusammenfassung. *Lacerta siculimelitensis* sp. n., eine ausgestorbene Rieseneidechse aus dem Jungpleistozän von Malta wird beschrieben. Es wird gezeigt, daß diese Art gleichzeitig auch auf Sizilien existierte. Zoogeographische Aspekte der fossilen Art werden im Vergleich mit rezenten Mitgliedern der Gattung diskutiert.

Introduction

Big growing species of recent *Lacerta* (total length more than half a meter) are distributed in islands as well as on mainlands. Species attaining a head-and-body length of more than 15 cm are:

1. The giant forms of the western Canary Islands El Hierro, and Gran Canaria, i. e. *Gallotia simonyi* (STEINDACHNER, 1889) and *G. stehlini* (SCHENKEL, 1901). The first named is remarkable as it had been considered to be extinct but was recently rediscovered (BÖHME and BINGS 1975, 1977). Both species belong to a group endemic to the Canarian archipelago and were ranked together as a single genus by ARNOLD (1973). The evidence for this is osteological (ARNOLD l. c.), hemipenial (BÖHME 1971, ARNOLD l. c.), morphological (PETERS 1961) and ethological (BÖHME and BISCHOFF 1976), but as this evidence concerns primarily primitive character states, the concept of this genus is merely symplesiomorphic (see also BÖHME et al. 1981).

2. The *Lacerta lepida*-group, distributed over Morocco, Algeria and Tunisia (*L. pater* LATASTE, 1889), the Iberian peninsula, southern France and the extreme Northwest of Italy (*L. lepida* DAUDIN, 1802). Its relationships are still somewhat obscure, as it has been classified partly with *Gallotia*, (PETERS 1961, BÖHME 1971) and partly with *Lacerta* s. str. (ARNOLD 1973), to which the next species belongs.

3. *Lacerta trilineata* BEDRIAGA, 1886, distributed over the greatest part of the Balcan peninsula, Anatolia and the Levante coast (Syria, Lebanon, Israel). This is the biggest form of a closely related species group, the so called Green lizards (*Lacerta* s. str.) which can be well characterized synapomorphically (PETERS 1962, BÖHME 1971).

4. *Lacerta jayakari* BOULENGER, 1887, an endemic relict of the Oman Mountains in the southeastern part of the Arabian peninsula. It shares some primitive features with the Canarian species group which of course do not indicate recent common ancestry, but which raise the possibility that two groups of primitive, ancient *Lacerta* stocks survived in refugial areas in the west and the east of the Mediterranean region (BÖHME and BISCHOFF 1976). The gap between them, at present populated by more advanced *Lacerta* species (*Lacerta* s. str., *L. lepida*) and the closely related genus *Podarcis*, draws the attention especially on fossil material, which may help to elucidate the history and phylogenetic relationships of the recent forms.

The aim of this paper is to describe a new species of fossil giant *Lacerta* from a Late Pleistocene deposit on the central Mediterranean island of Malta and to show that this species existed contemporaneously also on nearby Sicily.

Review of Previous Records of Maltese Pleistocene Lacerta.

The earliest reference to remains of a "lizard" encountered in Maltese Pleistocene deposits is to be found in a paper by Andrew Leith ADAMS (1865: 488) describing the contents of a rock fissure at Ta' Gandja, limits of Mqabba, central Malta. It was in the following year, however, that ADAMS attributed these reptilian remains to the genus *Lacerta* (1866: 594).

Though some of the lacertilian material collected by ADAMS was recovered from the Ta' Gandja fissure, most of it was obtained from the "red loam and pebble strata of Benghisa Gap" on the south coast of the island (ADAMS 1866: 594, 1867: 460, 1870: 193, 238). Unfortunately, his material could not be traced either at the British Museum (Nat. Hist.), London, or at the National Museum of Natural History, Malta, so that it was not available for study.

The *Lacerta* finds which he encountered are recorded as having been associated with the remains of more than one species of chelonian, with those of *Palaeoloxodon falconeri, Hippopotamus pentlandi, Leithia melitensis*, birds, one or two species of frogs and also with shells of land snails (ADAMS 1866: 594). This association lead ADAMS to record (1877:188) that "a contemporaneity may be claimed for the Elephants, Hippopotami, Myoxi, Chelonia, Lacertilia and certain Helicidae as their remains were intimately associated".

The nature of the Pleistocene deposits as well as the arrangement and condition of the embedded fossil faunal remains revealed that they had, for the most part, been conveyed into the above-mentioned sites through the agency of water – which at that time overflooded the greater part of Malta.

The *Lacerta* remains were of various size: some belonged to "small lizards" (ADAMS 1865: 488), but others were attributed to larger specimens comparable in size to a small chameleon. These were recorded by ADAMS as being "of about the dimensions of"

(1866: 594), "as large as" (1870: 193) or "somewhat larger than the North African and European chameleon" (1870: 238).

In a paper entitled "La Geologia ed i Fossili delle Isole Maltesi" published in the "General Guide to Malta and Gozo for the Year 1912" Giovanni GULIA lists (on p. 314) "una Lucertola di maggiori dimensioni della commune" amongst the finds recorded from Maltese Pleistocene deposits. In the following year (1913: 551) when reviewing the animals of the Maltese islands at the 9th International Congress of Zoology held in Monaco, GULIA again lists "una grande Lucertola" among the fossil remains. This time, however, he mysteriously adds (in brackets), the specific name *Lacerta melitensis*. He does not describe or figure this large lizard and makes no mention of the author or date of description of the "new species". As was usual in those days, the publication carries no bibliographic references that could possibly help to trace the author of such a name. A thorough search in literature for the original description and the institution of this species was fruitless. It is consequently presumed that GULIA unwarrantedly adopted the specific name *melitensis* merely because he realised that this was a new species and that "*melitensis*" was the commonest name used for fossil taxa from this island. BATE must have realized that there was no scientific basis for this name, for when – in the interest of "workers on the paleontology of the Mediterranean Region" – she gave "as complete a list as possible of the vertebrates of which remains have been obtained from the Pleistocene of Malta", she makes no reference to "*Lacerta melitensis*", but solely to the find of "*Lacerta* sp." (p. 422).

Whatever reason GULIA might have had for calling the large lizard of the Maltese Pleistocene by that specific name, "*Lacerta melitensis* GULIA, 1913" must be considered a nomen nudum! It is consequently very surprising to find that even MERTENS (1942:336) uses such a name when referring to the Maltese Pleistocene lizard. When describing his *Lacerta goliath* from Tenerife, Canary Islands, he discusses the phenomenon that on many islands, one can observe the co-existence of giant and dwarf lizards: „Übrigens ist auch von ganz anderen Inseln das Nebeneinandervorkommen von Riesen und Zwergen aus der gleichen verwandtschaftlichen Gruppe bekannt: so lebte früher auf Malta die große *Lacerta melitensis* sicherlich neben einer kleineren Art aus der *muralis*-Gruppe"!

Our assumption that the name might have referred to some unpublished material in the Senckenberg Museum, Frankfurt/Main, which MERTENS might have intended to describe at a later date, proved to be groundless, for neither in the herpetological nor in the paleontological collections of that museum is there any material of fossil lizards from Malta (KLEMMER and STORCH, pers. comm.). It is possible that MERTENS knew that GULIA had called the large-sized fossil lizard *Lacerta melitensis* without giving author or date of publication of the species, but he was probably in no position to check bibliographically on the specific name (MERTENS' paper was published in 1942, during World War II, which was no easy time for carrying out research), and used it notwithstanding.

The first evidence of any such large-sized lizard being present in other areas of the Mediterranean region comes from a paper by BATE (1918) when she describes a Pleistocene dormouse (*Hypnomys*) from the Balearic Islands and records its association with a big fossil *Lacerta*. Notwithstanding that BATE examined most (if not all) Maltese Pleistocene material reaching the British Museum (Nat. Hist.) between 1913 and the late 1930s, she never recorded having encountered the presence of any *Lacerta* remains.

When, however, she visited the Tal-Gnien fissure (limits of Mqabba, central Malta) in 1934, she personally collected a small fragment of a lizard maxilla with three teeth in situ and deposited it in the BMNH collection. This specimen is now registered as R.9306, but was never identified with certainty. Recently it was studied by one of us (W.B.) who was also unable to assign it specifically.

Discovery and Description of the Wied Incita Fissure

The fossiliferous fissure from where our new species of large *Lacerta* is described came first to the attention of the junior author in october 1973, when tusks of *Leithia melitensis* were noticed amongst some fossils collected by a foreign PhD. student (H. M. PEDLEY), who was then engaged in studying Maltese geology for his thesis. Inquiry about the origin of his micromammal material revealed that it was collected from soil dumped on a rubble pile in a Lower Coralline Limestone quarry at the Wied Incita inlier, on the limits of Attard, central Malta (fig. 1). The site was visited by the junior author the next day and the dark red, highly fossiliferous, loamy soil on the rubble pile (fig. 2) was traced to a fissure about 30 m eastwards in the same Lower Coralline Limestone quarry (fig. 3).

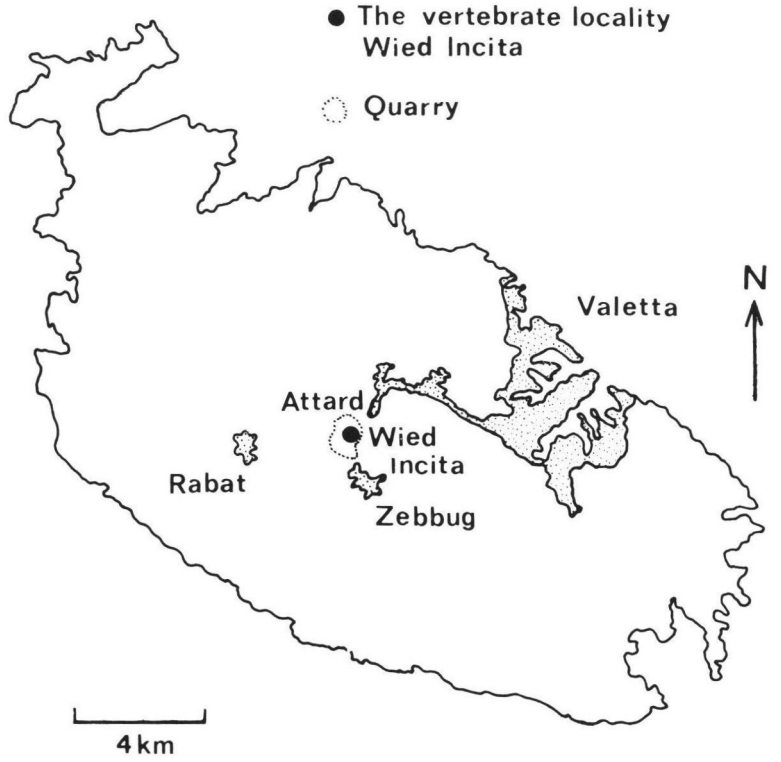

Fig. 1. Map of the Island of Malta showing the position of the Wied incita fissure filling in Lower Coralline Limestone.

Fig. 2. Junior author (right) investigating the "rubble pile" at Wied Incita quarry, October 1973.

Fig. 3. Eastern end of the Lower Coralline Limestone quarry at Wied Incita showing the remains of the fossiliferous fissure (arrowed).

The quarry which is worked by blasting to provide spalls for road surfacing and course aggregate for building construction, was at that time being worked at two different levels. The fissure was located on the lowermost one of these levels at a depth of about 25 m below the original rock surface. Two other solution features in the form of cylindrical vents lie one on either side of the fissure and it is not likely that they had ever been in communication with it. The structure to the east of the fissure was devoid of any soil, but the much wider circular opening on the other side was infilled with very dark red loamy soil identical with that of the middle fissure but devoid of any organic remains – possibly because it lies at a higher level than the fossiliferous fissure (fig. 3).

The actual measurements of the middle fissure could not be ascertained as when it was investigated, its northern section had already been completely destroyed. The re-

maining part shows that the fossiliferous fissure was originally bell-shaped – wider at the base and narrowed upwards. A 13 cm thick layer of unstratified, very dark red, loamy soil with occasional brown patches adhered to the smoothened wall of the fissure up to a height of 2,5 m. The deposit at the base, also unstratified, was 1,5 m thick. Much of the upper deposit had fallen off as large lumps and lay scattered on the quarry floor below (fig. 4).

Fig. 4. Junior author investigating the fossiliferous dark red, loamy soil that formerly infilled the middle fissure.

Description of the Deposit and its Contained Fauna

The unstratified, dark red loamy soil deposit contained no pebbles, but only a few angular rock fragments. A small number of Tertiary fossils derived from local rocks was also encountered, but remains of the mammalian genera *Paleoloxodon, Hippopotamus, Cervus* and shells of helicid snails were conspicuously absent.

The deposit was extremely rich in organic remain, particularly tusks, jaws, isolated molars and vestibular organs (endotympanics) of *Leithia* and of a new species of another dormouse, *Eliomys (Maltamys) wiedincitensis,* recently described jointly by the junior author and de Bruijn (Zammit-Maempel and de Bruijn 1982). One jaw of a *Rhinolophus,* complete with all teeth in situ, a left upper second molar of *Ursus arctos* as well as several avian remains, fragmented chelonian parts and a number of unidentified 1–3 mm long carbonised objects (vegetation?) were also encountered.

The lizard genus *Lacerta* was represented by jaw fragments, isolated teeth and several presacral vertebrae. A single fragment of a quite large dentary showed a very peculiar

dentitional feature which cannot be explained by the phenomena of tooth replacement as decribed by ROČEK (1980). This characteristic feature is not known in any recent or fossil *Lacerta,* but occurs in a species from the Pleistocene of Sicily, described and figured by KOTSAKIS (1977) as *"Lacerta* sp."(l.c.:217). The hypothesis favoured by this author to interpret his finding is far from being convincing and will be discussed in detail below. It is clearly evident, however, that our new find from the Maltese Pleistocene and the remains recorded by KOTSAKIS from the Sicilian Pleistocene involve the same unnamed species which we herein describe as

Lacerta siculimelitensis sp.n.

? *Lacerta* sp. – ADAMS 1866, Quart. J. Geol. Soc. London, 22: 594.
? *Lacerta* sp. – ADAMS 1870, Notes of a Naturalist in the Nile Valley and Malta. Edinburgh: 193, 238.
? Lacerta sp. – ADAMS 1877, Quart. J. Geol. Soc. London, 33: 188.
Lacerta melitensis GULIA 1913, IX[e] Congr. Int. Zoologie, Monaco: 551 (nomen nudum)
Lacerta melitensis MERTENS 1942, Senckenbergiana, 25: 366 (nomen nudum)
Lacerta sp. – KOTSAKIS 1977, Geologica Rom., 16: 217.

Diagnosis: A big growing *Lacerta* which was able to attain a total length of ca. 700–750 mm. It is distinguished from recent and other fossil *Lacerta* species by a peculiar heterodont dentition (at least in the lower jaw).

Holotype: National Museum of Natural History Malta: Q/401/W. (formerly Coll. ZAMMIT-MAEMPEL W.8), leg. G. ZAMMIT-MAEMPEL Oct. 1973.

Type locality: Wied Incita quarry, near Attard, central Malta (fig. 1).

Type stratum: Late Pleistocene (Würmian), cf. ZAMMIT-MAEMPEL and de BRUIJN 1982.

Description of holotype: The dentary – which lacks its anterior and posterior ends – has a total length of 21 mm. The shape of the bone is stout and comparable with that of *Lacerta lepida, Gallotia stehlini* and *G. simonyi.* In its present defective state (with its foremost part and teeth missing) the dentary carries 12 long teeth of subequal size (3.9 mm) anteriorly, followed posteriorly by a series of 5 other teeth of a markedly reduced size (2.0 mm). These form the inner end of the tooth row. The tip of the longer teeth is somewhat abraded, so that the number of cusps per tooth can only be guessed. In some, however, an anterior projection is clearly discernible and on careful examination, traces of a posterior projection are also evident, indicating that at least some teeth were originally tricuspid.

The posterior five teeth are simply conical and the last two of the series are partly fused.

The outer surface of the preserved fragment shows relatively large distinct foramina dento-facialia, four of which are arranged in a straight longitudinal series. A small punctiform additional foramen is situated between the third and fourth foramina of the main series, but at a lower level.

Paratypes: There are 9 small fragments (Coll. ZAMMIT-MAEMPEL W.9. i–vii, and Mus. Koenig, Bonn, ZFMK 37037–38) which are considered here to belong to the same species, due to their size and also to their kind of fossilisation. Six of them are parts of dentaries, four are maxillary fragments. The preserved pieces do not show, however, the diagnostic dentitional type of the new species, due to the lack of the respective hindpart of the dentaries. It cannot be decided whether one or more of them belong to the same individual which possessed the relatively most complete dentary designated here as holotype. It can be stated, however, that on the basis of the fragments available smaller individuals are also involved. Their total length is estimated to have been approximately 400–500 mm.

Etymology: The species name retains the geographical element of GULIA's denomination and adds the reference to Sicily in order to point out the zoogeographic characteristic of the new lizard.

Discussion

a. Individual age of the specimen: The individual age of the specimen is difficult to judge. As for the method demonstrated by ROČEK (1980) which uses the length of tooth replacement waves, we can state, that the last five teeth are still included in replacement waves and are not yet permanent. This would mean that our specimen is not extremely old. The length of the replacement waves, however, cannot be discerned with certainty as developing teeth are not preserved and the whole bone is not complete.

An examination of a skull series of *Gallotia stehlini,* partly from the Vienna Natural History Museum (see also SIEBENROCK 1894) and partly from the Museum Koenig, Bonn, revealed that the relative size of the foramina dento-facialia decreases with the increasing age of the animal. Dentaries of equal size as the holotype of *Lacerta siculimelitensis* sp. n. exhibit much smaller foramina, thus suggesting that the last named specimen is not fullgrown. The estimated total length of 700–750 mm (see diagnosis) is based also on material of *G. stehlini,* where dentaries of the same size as our holotype have a head length of 57 mm and a head-and-body length of 220 mm. As the unregenerated (!) tail in such lizards attains a length of more than double that of head and body, the total length of the new species is likely to be more than 700 mm. So that if the assumption that the type specimen of *L. siculimelitensis* n. sp. was not fullgrown is correct, a total length of 800 mm or more is also possible. On the basis of this assumption the new fossil species would have attained a size class which is known only from *Gallotia simonyi* and *G. stehlini* and their fossil predecessors *(G. goliath, G. maxima)* and from *Lacerta lepida. Lacerta trilineata* and *L. jayakari* (see introduction) remain distinctly smaller.

b. Generic assignment: As pointed out in the introduction, ARNOLD (1973) placed the endemic lacertids of the Canary Islands in a separate genus *Gallotia,* mostly on the basis of plesiomorphic characters. The main osteological feature is the shape of the caudal vertebrae, but in the case of our fragmentary material it is not possible to utilize this character, since it contains no caudal vertebrae. The few vertebrae found associated with

the jaw fragments at Wied Incita are 1. very small and 2. consist solely of presacral ones, so that it cannot be ascertained whether they belonged to juveniles of *Lacerta siculimelitensis* or to a sympatric smaller species, possibly of the *Podarcis filfolensis* group (see MERTENS 1942:336). We are thus inclined to apply the name *Lacerta,* which now includes an unnatural assemblage of different species groups (BÖHME 1981:375). This decision is based partly on geographical grounds – in that *Gallotia,* apart from its structural characters, is defined also by its geographical distribution – and partly on the shape of caudal vertebrae in the KOTSAKIS material (1977). His material is more complete than ours in that it contains also caudal vertebrae. Unfortunately these vertebrae were not available for study but are said to be identical with those of *Lacerta viridis.* This implies that they lack the "C-pattern" (sensu ARNOLD 1973) characteristic of the genus *Gallotia.*

c. Distribution: The most interesting fact is that the Pleistocene (Würmian) remains of a big *Lacerta* from Sicily (*Lacerta* sp.: KOTSAKIS 1977) are clearly referable to *Lacerta siculimelitensis* sp. n. The dentary figured by KOTSAKIS (1977: fig. 2 A) shows the same peculiar type of heterodont dentition, i. e. a series of abruptly reduced teeth at the inner end of the tooth row. The same specimen is reproduced here in fig. 5 B. It is thus clear that *L. siculimelitensis* belongs to the extinct fauna common to Malta and Sicily and was on both island associated with *Palaeoloxodon falconeri* and other fauna (VAUFREY 1929, STORCH 1974)

The association of *Lacerta siculimelitensis* sp. n. with *Eliomys (Maltamys) wiedincitensis* ZAMMIT-MAEMPEL and de BRUIJN 1982, and the absence of any associated *Palaeoloxodon, Hippopotamus* or *Cervus* remains is very significant, in that it indicates a very late Pleistocene assemblage.

d. Relationships: The heterodont type of dentition which is doubtlessly a derived character, is not known in any other living (SIEBENROCK 1894, KLEMMER 1957, ARNOLD 1973, BÖHME unpubl.) or fossil *Lacerta* (summary by ROČEK, in press). So it is possible to place the Malta and Sicily form together in one species characterized by a common derived structure. From this follows that the discussion by KOTSAKIS (1977: 218) must be revised. This author offered four hypotheses in order to interprete his "*Lacerta* sp":

1. It could be identified with *L. trilineata.*
2. It could be identified with *L. lepida.*
3. It could be a new species.
4. It could "belong to a local race subspecies of *Lacerta viridis* Laurenti developed from a population that arrived in the island from Europe during the Lower Pleistocene. The main characteristic of this form seems to be it's size, rather bigger then (sic!) the continental green lizards. The arrival of a new population of the same species and normal size, during the last phases of the Würmian, brought to a reduction of the dimension of the local race. The author is in favour of this last hypothesis" (KOTSAKIS l. c.: 224).

Hypotheses 1, 2 and 4 are contradicted by the peculiar dentition which does not occur in the species *L. trilineata, lepida* and *viridis*, and which – astonishingly – was not recognized by KOTSAKIS (l. c.). Moreover there is no zoogeographical evidence for hypotheses 1 and 2, meaning that neither *L. lepida* nor *L. trilineata* had a former distribution

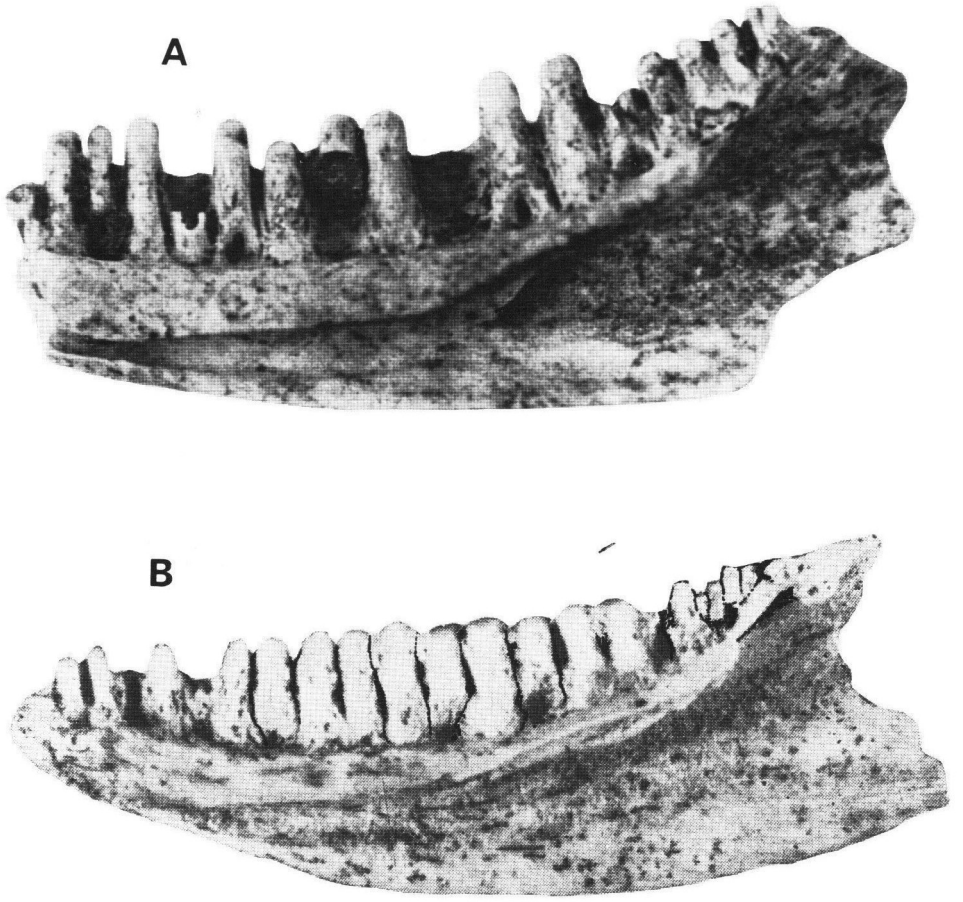

Fig. 5. Right dentaries of *Lacerta siculimelitensis* sp. n. **A** – Holotype from Wied Incita, Malta (Length of bone 21 mm), **B** – from Spinagallo, Sicily (Length of bone 25,1 mm).

area which included the Sicily – Malta region. On the contrary, the center of evolution of *L. trilineata* is situated in Asia Minor (PETERS 1964), whereas that of the *L. lepida* group is restricted to the western Mediterranean with the most easterly populations of *L. (lepida) pater* (cfr BISCHOFF 1982) in Tunisia being more advanced than the Moroccan ones (BOULENGER 1920: 104, PETERS, 1961: 281). Hypothesis 4, favoured by its author, must also be rejected because of the fact – besides the dentition, see above – that the proposed concept is purely artificial and does not fit with modern views of subspeciation: It is absolutely unlikely that an old isolate of big body size undergoes a reduction in size when its area is penetrated by a much younger, but nevertheless conspecific form, resulting in a fusion of both phenotypes! Moreover KOTSAKIS was unaware that the same form discussed by him existed also on Malta where no green lizards are extant today.

In conclucion his third hypothesis – which he does not consider further – proves to be the correct one.

The Maltese remains of *L. siculimelitensis* sp. n. were associated with material of the extinct dormouse genus *Leithia* and subgenus *Maltamys* (see 'Description of the Deposit and its Contained Fauna' and ZAMMIT-MAEMPEL and de BRUIJN 1982). It is interesting to note here that when BATE (1918: 218) describes her dormouse genus *Hypnomys* (a close relative of *Leithia* and *Maltamys*) from the Balearic Islands, she, too, records the presence of lizard remains being associated with her glirid, but these were, acoording to a determination by G. A. BOULENGER, of the "*viridis-ocellata*-group".

In analogy to the relations between the glirids *Hypnomys* and *Leithia*, which were more specialized in their nutrition than the recent glirid *Eliomys* (BATE l.c.), one could assume that there are also relations between the big growing *Lacerta* forms from the Pleistocene of the Balearics and of Malta/Sicily respectively. This comparison would also fit the assumption that due to their derived dentition, the fossil lizards, too, were more specialized in their nutrition than the recent forms. However, as long as the Balearic lizard remains recorded by BATE (1918) cannot be traced in any collection (and therefore, cannot be reinvestigated) further material is still needed to put these speculations on a sounder basis. According to ALCOVER et al. (1981) all new lizard material obtained from the Balearics and of Malta/Sicily one must have in mind that the last contact across the genus: ARNOLD 1973), meaning that also on these islands small-sized and large-sized lizards may have co-existed. As to the relationships between the large-sized *Lacerta* of the Balearics and of Malta/Sicily one must have in mind that the last ccontact across the Tyrrhenian region dates back to the Miocene – Pliocene boundary (ALCOVER et al. 1981).

Acknowledgements. There were many colleagues who helped us with information and advice: Dr. H. M. PEDLEY revealed the locality of his Pleistocene material; Dr. H. W. BALL, London (British Museum Nat. Hist., Dept. of Paleontology) loaned us the Malta lizard jaw fragment and gave additional information on material under his care; Dr. F. TIEDEMANN (Vienna Natural History Museum) allowed us to borrow the *G. stehlini* skull series used already by SIEBENROCK; Dr. M. B. SANCHIZ, Madrid, informed us that the BATE material from the Balearics cannot be traced in any Spanish collection; Dr. R. ESTES, San Diego, Prof. Dr. C. M. GARCIA CRUZ, La Laguna, Prof. Dr. S. KUSS, Freiburg, Dr. A. C. MILNER, London, Dr. J.-C. RAGE, Paris, Dr. B. SCHNEIDER, Pirmasens, and Dr. R. WILD, Ludwigsburg, discussed with us the name *Lacerta melitensis* and assured us that it is a nomen nudum; Dr. K. KLEMMER aand Dr. G. STORCH, Frankfurt/Main, contributed valuable information; Mr. W. BISCHOFF, Bonn, Prof. Dr. H. HEMMER, Mainz, Dr. Z. ROČEK and Prof. Dr. Z. V. ŠPINAR, both Prague, critically read the manuscript. Their help is gratefully acknowledged.

References

ADAMS, A. L. (1865): History of the Discovery of the Fossil Elephant of Malta, with a Description of the Fissure in which it was originally found. Geol. Mag. **1865**: 488–491.

ADAMS, A. L. (1866): Bones of Fossil Chelonians from the Ossiferous Caves and Fissures of Malta. Quart. J. Geol. Soc. London **22**: 594–595.

ADAMS, A. L. (1867): Second report on Maltese Fossiliferous Caves. Report Brit. Ass. Adv. Sci. for 1866: 458–463.

ADAMS, A. L. (1870): Notes of a Naturalist in the Nile Valley and Malta. Edinburgh (Edmonton and Douglas).

ADAMS, A. L. (1877): On Gigantic Land-Tortoises and a small Freshwater Species from the Ossiferous Caverns of Malta, together with a List of their Fossil Fauna; and a Note on Chelonian Remains from the Rock-Cavities of Gibraltar. Quart. J. Geol. Soc. London **33**: 177–191.

ALCOVER, A., MOYA-SOLA, S., PONS-MOYA, J. (1981): Les Quimeres del Passat. Els vertebrats fòssils del plio-quaternari de les Balears i Pitiüses. Ciutat de Mallorca (Moll).

ARNOLD, E. N. (1973): Relationships of the Palaearctic Lizards Assigned to the Genera *Lacerta, Algyroides* and *Psammodromus*. Bull. Brit. Mus. Nat. Hist. (Zool.) **25**: 291–366.

BATE, D. M. A. (1916): On a small Collection of Vertebrate Remains from the Gar Dalam Cavern, Malta; With Note on a new species of the genus *Cygnus*. Proc. Zool. Soc. Lond. **28**: 421–430.

BATE, D. M. A. (1918): On a New Genus of Extinct Muscardine Rodent from the Balearic Islands. Proc. Zool. Soc. London **1918**: 209–222.

BISCHOFF, W. (1982): Zur Frage der taxonomischen Stellung europäischer und nordwestafrikanischer Perleidechsen (Sauria, Lacertidae, *Lacerta lepida*-Gruppe). Amphibia-Reptilia **2**: 357–367.

BÖHME, W. (1971): Über das Stachelepithel am Hemipenis lacertider Eidechsen und seine systematische Bedeutung. Z. Zool. Syst. Evolutionsf. **9**: 187–223.

BÖHME, W. (1981) (ed.): Handbuch der Reptilien und Amphibien Europas. Vol. 1, Wiesbaden (Akad. Verlagsges.), 530 pp.

BÖHME, W., BISCHOFF, W. (1976): Das Paarungsverhalten der kanarischen Eidechsen (Sauria, Lacertidae) als systematisches Merkmal. Salamandra **12**: 109–119.

BÖHME, W., BISCHOFF, W., NETTMANN, H. K., RYKENA, S., FREUNDLICH, J. (1981): Nachweis von *Gallotia simonyi* (STEINDACHNER, 1889) (Reptilia: Lacertidae) aus einer frühmittelalterlichen Fundschicht auf Hierro, Kanarische Inseln. Bonn. Zool. Beitr. **32**: 157–166.

BÖHME, W., BINGS, W. (1977): Nachträge zur Kenntnis der kanarischen Rieseneidechsen (*Lacerta simonyi*-Gruppe) (Reptilia, Sauria, Lacertidae). Salamandra **13**: 105–111.

BOULENGER, G. A. (1920): Monograph of the Lacertidae. London (Trustees Brit. Mus.), vol. 1., 352 pp.

GULIA, G. (1912): La Geologia ed i Fossili delle Isole Maltesi. General Guide to Malta and Gozo for the Year 1912. Compiled by G. Muscat, Malta. pp. 291–318.

GULIA, G. (1913): Uno sguargdo alla Zoologia delle "Isole Maltesi". IX^{e} Congr. Int. Zoologie, Monaco, 1913, Sect. IV, pp. 545–555.

KLEMMER, K. (1957): Untersuchungen zur Osteologie und Taxonomie der europäischen Mauereidechsen. Abh. Senckenberg. naturf. Ges. **496**: 1–56.

KOTSAKIS, T. (1977): I resti di anfibi i rettili pleistocenici della grotta de Spinagallo (Siracusa, Sicilia). Geologica Rom. **16**: 211–229.

MERTENS, R. (1942): *Lacerta goliath* n. sp., eine ausgestorbene Rieseneidechse von den Kanaren. Senckenbergiana **25**: 330–339.

PETERS, G. (1961): Die Perleidechse (*Lacerta lepida* DAUDIN) gehört zum Subgenus *Gallotia* BOULENGER. Mitt. Zool. Mus. Berlin **37**: 271–285.

PETERS, G. (1962): Studien zur Taxionomie, Verbreitung und Ökologie der Smaragdeidechsen. I. *Lacerta trilineata, viridis* und *strigata* als selbständige Arten. Mitt. Zool. Mus. Berlin **38**: 127–152.

PETERS, G. (1964): Studien zur Taxionomie, Verbreitung und Ökologie der Smaragdeidechsen. III. Die orientalischen Populationen von *Lacerta trilineata*. Mitt. Zool. Mus. Berlin **40**: 185–250.

ROČEK, Z. (1980): Intraspecific and Ontogenetic Variation of the Dentition in the Green Lizard *Lacerta viridis* (Reptilia, Squamata). Vest. cs. Spolec. Zool. **44**: 272–277.

ROČEK, Z. (in press): Lizards (Reptilia: Sauria) from the Lower Miocene locality Dolnice (Bohemia, Czechoslovakia).

SIEBENROCK, F. (1894): Das Skelett der *Lacerta Simonyi* STEIND. und der Lacertidenfamilie überhaupt. Sitzungsber. Akad. Wiss., math.-naturw. Kl., Wien **103**: 205–292.

STORCH, G. (1974): Quartäre Fledermaus-Faunen von der Insel Malta. Senckenbergiana lethaea **55**: 407–434.

VAUFREY, R. (1929): Les éléphants nains des iles méditerranéennes et la question des isthmes pléistocènes. Arch. Inst. Paléontol. humaine, Mém. **6**: 1–220.

ZAMMIT-MAEMPEL, G., DE BRUIJN, H. (1982): The Plio/Pleistocene Gliridae from the Mediterranean Islands reconsidered. Proc. Konink. Nederl. Akad. Wetensch. (B) **85**(1): 113–128.

Received: December 30, 1981