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Morphometric and immunological relationships among some Greek *Mus* L. populations (Mammalia, Rodentia, Muridae)

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Abstract

One hundred and ninety nine individuals of the wild house mouse were collected from twelve mainland and insular Greek localities and investigated both morphometrically and immunologically. This study expands information on the phylogenetic relationships of the two known *Mus* taxa occurring in mainland Greece and clarifies the systematic position of some insular populations from the Aegean and Ionian areas. The clear morphometric distinction of *Mus musculus domesticus* from *Mus macedonicus* was confirmed and reevaluated on the basis of the statistical analysis of sixteen body and cranial characters as well as on the two discriminant ratios already established (body and zygomatic coefficients, as described in the text). Also, a diagnostic key has been constructed using stepwise discriminant analysis which gives mean values of 0.523 for *M. musculus domesticus* and –3.197 for *M. macedonicus*. The albumin immunological distance between these two taxa was 6 ID units, corresponding to a time divergence of about 1–1.2 million years between them. Contrary to the traditional opinion that Crete and some other Aegean islands are inhabited by the distinct taxon *M. musculus praetextus*, the results of our Canonical Analysis and MANOVA tests indicated a considerable morphological overlap of all the insular mice populations studied. Only the single form *M. musculus domesticus* appears to be present. This opinion is also corroborated by our immunological data. Paleontological evidence and the probable evolutionary history of *Mus* in the southern Aegean area are also briefly discussed.

Introduction

According to Auffray et al. (1990 a, c) five taxa of house mice occur in mainland Europe and the circum – Mediterranean region. Greece is regarded as being inhabited by two of these taxa which are morphologically, biochemically and ecologically distinct (Bonhomme et al. 1978; Thaler et al. 1981; Orsini et al. 1983; Bonhomme et al. 1983, 1984). These are (a) *Mus musculus domesticus* Schwarz and Schwarz, 1943 (also referred to as *M. domesticus* by Marshall and Sage 1981; Sage et al. 1986), a relatively long-tailed species that may be either commensal and feral, and (b) *Mus macedonicus* Petrov and Ruzic, 1983 (formerly known as *M. musculus spicilegus, M. abbotti* or *M. spretoides*), a relatively short-tailed and exclusively feral species. Earlier studies (Schwarz and Schwarz 1943; Zimmermann 1953; Ondrias 1966; Reichstein 1978; Engels 1980, 1983) suggested the occurrence of two additional taxa in the Greek area: *M. m. brevirostris* Waterhouse, 1837, a commensal form supposedly widely distributed both on the mainland and islands, and *M. m. praetextus* Brants, 1927, described as a feral insular form distributed on Crete and other Aegean islands (*M. m. praetextus* has also been reported from Cyprus, Sicily and other Mediterranean islands and from northern Africa and the Middle-East). These latter

two taxa have been described mainly on the basis of fur color. However, their taxonomic validity has been disputed by Selander and Yang (1969), Britton and Thaler (1978), Sage (1981) and Britton-Davidian (1990) on the basis of biochemical data. These authors argue that neither form differs genetically from *M. m. domesticus* and thus should not be considered as distinct taxa.

Despite the clarification of relationships among the European *Mus* taxa during the last fifteen years, the taxonomic status of the Greek populations (especially the insular ones) is unclear. The material from Greece used in the few studies carried out during that time period is both quantitatively limited, geographically restricted and insufficiently analyzed. In this study we present data on the morphometric variation and the albumin immunological differentiation of some Greek *Mus* populations, inhabiting an area of the Mediterranean basin which is thought to be an important site in the route of European colonization by *Mus* (Auffray et al. 1990 c).

Material and methods

Morphometric study

A total of 199 adult mice, live trapped at the localities shown in figure 1, were studied morphologically. Mice of the Macedonian sample were identified as *M. macedonicus* according to morphological, ecological and zoogeographical data already known for the short-tailed mice of southern Balkans (Marshall and Sage 1981; Orsini et al. 1983; Kratochvil 1986; Vohralik and Sofianidou 1987; Auffray et al. 1990 a; Gerasimov et al. 1990). Also, animals of the Patra sample were classified as *M. m. domesticus* according to available data (Fraguedakis-Tsolis et al. 1986; Giagia et al. 1987; Fraguedakis-Tsolis 1992). All specimens (skins and skulls) are deposited in the collections of the Zoological Museum of Patra University. Sixteen morphometric measurements corresponding to four external and 12 skull characters were analyzed: Head + body length (HB), tail length (TL), ear length (EL), hind foot length (HFL), condylobasal length (CBL), basilar length (BL), diastema length (DL), palatal length (PL), nasal length (NL), mandibular length (ML), distance between the incisor and the third molar of the upper jaw ($I–M^3$), zygomatic width (ZW), upper molar series length (UMSL), lower molar series length (LMSL), width of the anterior part of the malar process (dorsal ramus) (A), width of the upper part of the zygomatic arch (B). Also two ratios were analyzed separately. These are head + body length/tail length (H + B/TL) and A/B (zygomatic coefficient, ZC). All linear measurements were taken with a Preisser Digi-Met. digital vernier caliper with an approximation of 0.01 mm. External characters were measured with a rule to the nearest mm. For the definition of these measurements we followed Niethammer and Krapp (1978) and Darviche and Orsini (1982).

For comparitive purposes three additional samples were considered. The first was from Antikythira, which consisted of six specimens (collected by us), for which the complete set of measurements was obtained. The other two were (a) from Cyprus, originally classified as *M. m. praetextus* and (b) from Germany and Yugoslavia, originally classified as *M. m. domesticus* (both described in Reichstein 1978). The two latter samples each consisted of 14 specimens, and included seven variables that we measured (H + B, TL, HFL, EL, CBL, DL, ZW).

Canonical (Discriminant) Analysis was used to represent the multivariate structure of the data. Multivariate Analysis of Variance (MANOVA) was used to detect differences between populations. P-values given in this study correspond to the Wilk's criterion, however all other MANOVA criteria (Pillai trace, Hotteling-Lawley trace or Roy's ϑ) gave similar results. For all multivariate methods presented in this study the reader can find useful references in Morrison 1976 or Reyment et al. 1984.

The SYSTAT statistical package, with its SYGRAPH module (Wilkinson 1988) was used for all the analyses and graphs presented in this study.

Immunological study

For the determination of albumin immunological differences among the *Mus* samples tested, reciprocal experiments of the micro-complement fixation (MC'F) quantitative tests were carried out, according to the method of Champion et al. (1974). These differences are expressed in immunological distance units (D units) which are generally believed to be a reliable measure of amino acid sequence differences

Fig. 1. Map of Greece indicating the *Mus* sampling localities. 1: Langadikia, Macedonia. 2: Patra, Peloponnese, 3, 4: Zakynthos and Strofades islands (Ionian Sea). 5: Antikythira island. 6: Paleochora. 7: Spili. 8: Milatos. 9: Between Ierapetra and Ag. Nikolaos. 10: Sitia (localities 6–10 are on Crete island). 11, 12: Kasos and Kos islands (Dodecanisa archipelago, Aegean Sea). All mice collected were of the feral ecotype except those of Patra which were of both the commensal and feral ones.

between the albumins of the taxa being compared. As representative material of the two known Greek taxa, *M. m. domesticus* and *M. macedonicus*, mice from Patra (n = 30) and Langadikia (n = 18) were used, respectively. In addition, mice from Crete (n = 30) were also tested, since we considered their taxonomic position ambiguous.

The pooled individual sera of each of the three samples were subjected to successive chromatography through Sephadex G-150 and DEAE cellulose columns in order to isolate and purify the serum albumin. Three New Zealand rabbits were immunized against each sample albumin, and the resulting antisera were titrated using the MC'F procedure and pooled in an inverse proportion to their titers (Prager and Wilson 1971). For more details see also Nikoletopoulos et al. (1992).

The computing of the immunological distances derived from the results of the MC'F experiments was made using the formula given by Champion et al. (1974). Since each one-way MC'F experiment for each pair of samples was carried out three times, the mean and standard deviation were calculated. The final immunological distance value of each sample pair was the mean of the two one-way means of the reciprocal experiments. In the case of reciprocal MC'F tests it was also necessary to estimate the parameter σ which expresses the percent standard deviation from reciprocity (Beverley and Wilson 1982).

Results

Morphometric study

A preliminary analysis of the raw data indicated that there was no significant sexual dimorphism in any sample (MANOVA, $p > 0.05$). Also, since there were no significant dif-

Table 1. Mean, standard deviation (SD) and coefficient of variation (CV) of measurements (in mm) of the five populations studied. For abreviation of measurements see Material and methods.

	Patra (n = 116)			Crete (n = 24)			Macedonia (n = 28)			Dodecanisa (n = 9)			Ionian (n = 22)		
	mean	sd	cv	mean	sd	cv	mean	sd	cv	mean	sd	cv	mean	sd	cv
H + B	76.3	8.6	11.3%	84.8	5.6	6.6%	85.0	4.1	4.8%	76.3	4.3	5.6%	73.9	7.6	10.3%
TL	76.8	8.0	10.4%	81.0	6.7	8.2%	69.6	4.9	7.0%	81.9	4.8	5.9%	76.9	5.2	6.7%
HFL	17.3	1.1	6.4%	17.3	1.3	7.3%	17.1	0.8	4.6%	17.5	1.0	5.8%	17.6	1.6	9.0%
EL	13.8	1.5	10.6%	13.7	1.4	10.4%	12.9	0.7	5.6%	13.7	0.8	6.0%	13.7	1.9	13.8%
CBL	19.3	1.2	6.4%	21.0	0.8	3.9%	21.4	0.6	2.6%	19.6	0.6	2.8%	19.6	1.0	5.0%
BL	16.2	1.1	6.6%	17.5	0.7	4.1%	17.7	0.6	3.2%	16.6	0.7	4.0%	16.2	0.9	5.8%
PL	9.2	0.6	6.4%	10.0	0.4	4.0%	10.0	0.4	4.0%	8.9	0.7	7.3%	9.2	0.5	5.9%
NL	7.4	0.7	9.5%	8.3	0.6	6.8%	8.3	0.4	4.9%	7.8	0.4	4.6%	7.7	0.5	6.4%
DL	5.2	0.4	8.3%	5.5	0.3	5.8%	5.9	0.3	4.4%	5.2	0.3	6.3%	5.2	0.3	6.0%
I-M^3	8.0	0.5	6.4%	8.5	0.3	3.8%	8.9	0.4	4.3%	8.1	0.3	4.0%	7.9	0.4	4.7%
ZW	10.7	0.6	5.1%	11.5	0.4	3.8%	11.9	0.3	2.8%	11.0	0.2	2.1%	10.9	0.5	4.3%
ML	10.1	0.6	6.1%	11.0	0.5	4.1%	11.4	0.4	3.3%	10.6	0.5	4.9%	10.6	0.6	5.3%
UMSL	3.4	0.2	5.9%	3.8	0.2	5.6%	3.9	0.2	3.9%	3.4	0.2	7.1%	3.4	0.2	6.4%
LMSL	3.0	0.2	5.7%	3.3	0.2	5.2%	9.4	0.2	1.7%	3.1	0.3	9.8%	3.0	0.2	5.0%
A	0.5	0.1	17.0%	0.5	0.1	14.0%	0.7	0.1	19.2%	0.5	0.1	17.6%	0.5	0.1	16.3%
B	0.9	0.1	13.6%	1.0	0.1	12.1%	0.9	0.1	12.8%	0.8	0.1	9.5%	0.8	0.1	12.0%
H + B/TL	1.0	0.1	8.3%	1.1	0.1	8.8%	1.2	0.1	6.3%	0.9	0.1	6.2%	1.0	0.1	7.2%
ZC	0.5	0.2	19.9%	0.5	0.1	15.9%	0.9	0.2	19.5%	0.6	0.1	18.2%	0.6	0.1	16.2%

Table 2. Pairwise squared Mahalanobis distances. All pairwise T^2 comparisons are significant ($p < 0.001$), except that between Ionian and Dodecanisa ($p = 0.044$).

	Patra	Crete	Macedonia	Dodecanisa	Ionian
Patra	0				
Crete	7.25	0			
Macedonia	22.97	11.68	0		
Dodecanisa	8.55	13.71	31.81	0	
Ionian	4.79	7.19	22.42	6.47	0

ferences in body measurements between the mice from each of the respective sample pairs, the samples from Kasos and Kos and those from Zakynthos and Strofades were pooled. This procedure yielded two samples large enough for reliable comparisons. Thus, subsequent analyses were carried out on the following five samples: 1) Patra (*M. m. domesticus*), 2) Crete, 3) Kasos and Kos (collectively referred to as Dodecanisa), 4) Zakynthos and Strofades (collectively referred to as Ionian) and 5) Langadikia (referred to as Macedonia – *M. macedonicus*).

The basic statistics of the 16 variables and the two ratios for these five groups are presented in table 1. The variables A and B were excluded from further analysis, since they showed large intra-population variability.

Multivariate analysis: Our data were subjected to a five group Canonical Analysis. The MANOVA results were significant (Wilk's $\Lambda = 0.107$, $F = 9.78$, $df = 56,706$ and $p < 0.0001$). Pairwise Mahalanobis distances are given in table 2. All pairwise contrasts were significant except that between Ionian and Dodecanisa. It should be stressed that the comparisons Patra vs Dodecanisa and Patra vs Ionian were only significant because of the ML variable. Therefore, one may consider these three populations as belonging to the same taxon.

The plot of the first two Canonical Variates is given in figure 2. There is a considerable overlap between these populations, except for the first and most significant axis which clearly discriminates Macedonia from all the others. The third and fourth Canonical Variates reveal no differences between any of the populations.

In the bivariate plot of the log-transformed ratios (Fig. 3) it can be seen that Patra, Ionian, Dodecanisa and Crete are indistinguishable, and that they differ from Macedonia. A univariate ANOVA on the two ratios gave $F = 44.1$ ($p < 0.0001$) and $F = 39.9$ ($p < 0.0001$), respectively, while in both cases Tukey's HSD-test grouped together Patra, Crete, Ionian and Dodecanisa, which all differ from Macedonia ($p < 0.0001$). The discriminant functions obtained from the Canonical Analysis were applied to the Antikythira specimens, and five out of six were classified into Crete and the last one into Ionian.

The H + B/TL ratio was higher for the Cyprus sample (1.12 ± 0.06) than for those from Crete and Antikythira, and this difference is significant (t-test, $P < 0.01$). On the basis of the restricted set of the seven linear characters Cyprus is different from Crete (MANOVA, $p < 0.008$), but this difference is only due to the smaller TL values exhibited in the former sample. The calculation of Mahalanobis' distances between Cyprus and the Greek populations shows that the smallest distances are between Cyprus and Antikythira, as well as between Cyprus and Crete, while Cyprus is well separated from Dodecanisa, Macedonia, Patra and Ionian. Our statistical treatment of Reichstein's (1978) raw data showed no significant differences between *M. m. domesticus* and *M. m. praetextus* (Manova, $p = 0.185$), except for the TL variable which again had smaller values in individuals from Cyprus.

For a comparison at the species level between *M. m. domesticus* and *M. macedonicus* we summarize the statistics of the two ratios calculated from our material and that of other studies (Tab. 3).

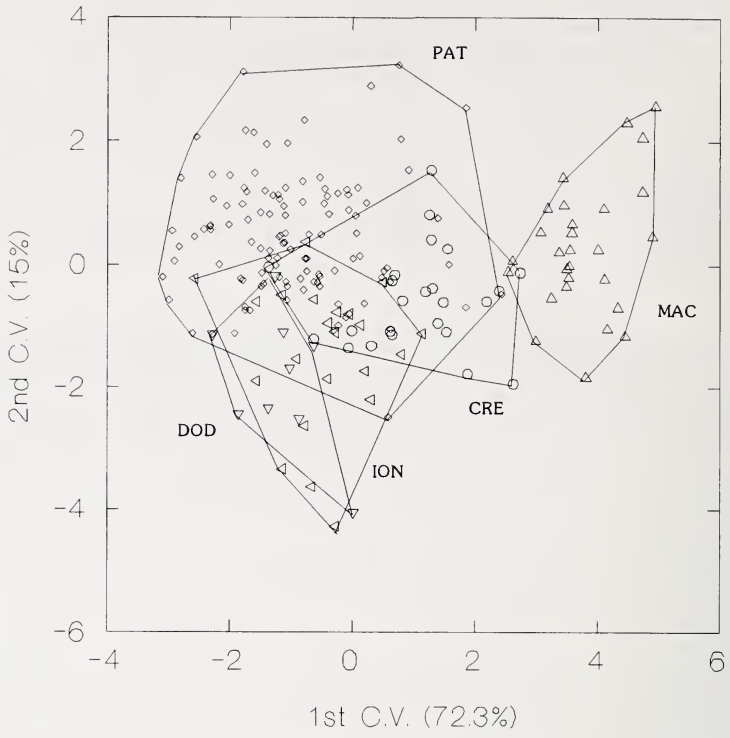

Fig. 2. First and second Canonical Variate plot with the borders of each population sample. PAT: Patra, CRE: Crete, MAC: Macedonia, DOD: Dodecanisa and ION: Ionian.

Immunological study

The average titre and slope values for the three *Mus* antisera used in this work are 3,167 (4,000, 2,900 and 2,600) and 385 (400, 395 and 360), respectively. These values lie within the range given in the literature for some rodent taxa (Nikoletopoulos et al. 1992). The immunological distance data computed from the results of the reciprocal MC'F tests are presented in table 4. The percentage standard deviation from reciprocity derived from our results took a value $\sigma = 6.4\%$ which is considered a satisfactorily low value lying within the limits of σ-values reported in similar studies (Ellis and Maxson 1980; Fuller et al. 1984; Nikoletopoulos et al. 1992; Fraguedakis-Tsolis et al. 1993).

The final values of immunological distances between each pair of taxa that we compared were:

M. m. domesticus – *M. macedonicus*: $(5.9 + 6.2)/2 = 6.05$ ID units
M. m. domesticus – Cretan *Mus*: $(0.5 + 0.2)/2 = 0.35$ ID units
M. macedonicus – Cretan *Mus*: $(5.8 + 6.6)/2 = 6.20$ ID units

Thus we see that the Cretan *Mus* are essentially indistinguishable from *M. m. domesticus* on immunological criteria and both of these taxa differ by approximately 6 ID units from *M. macedonicus*.

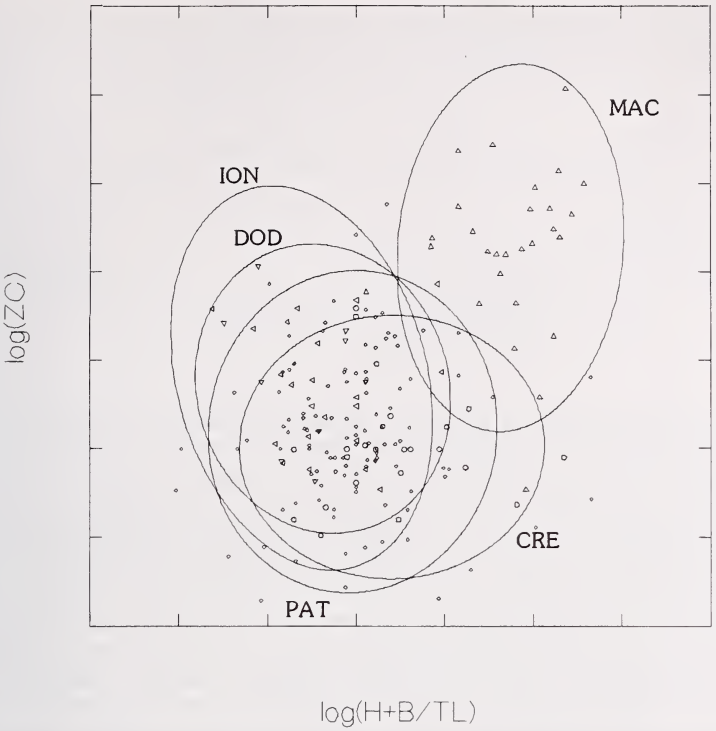

Fig. 3. Bivariate plot of the log-transformed ratios values with 90%-concentration ellipses for each population sample. PAT: Patra, CRE: Crete, MAC: Macedonia, DOD: Dodecanisa and ION: Ionian.

Table 3. Comparison of our and bibliographic data concerning the two discriminant morphometric ratios.

Ratios	Taxa	Data from								
		Orsini et al. (1983)			Auffray et al. (1990 b)			This study		
		n	x	SD	n	x	SD	n	x	SD
H + B/TL	*M. m.*	35	1.49	0.10	14	1.28	0.08	28	1.23	0.08
	M. m. d.	15	1.07	0.03	13	1.03	0.03	171	0.99	0.08
ZC	*M. m.*	45	0.74	0.10	47	0.80	0.10	28	0.86	0.17
	M. m. d.	22	0.47	0.05	52	0.52	0.07	116	0.53	0.11

M. m.: Mus macedonicus, M. m. d.: Mus musculus domesticus

Discussion

Both morphological and immunological differences found between individuals from Macedonia and Patra confirm the widely accepted distinction between *M. macedonicus* and *M. m. domesticus*. Actually, the immunological distance of 6 D units found between them indicates a rather substantial genetic differentiation of their albumins in comparison to

Table 4. Mean values (range and standard deviation in parenthesis) of the one-way albumin immunological distances (in ID units) computed from the results of the three repeating MC'F experiments for each pair of the three *Mus* samples tested.

Sample	Anti-*M. m. domesticus*	Anti-*M. macedonicus*	Anti-Cretan *Mus*
M. m. domesticus	0	6.2 (6.0–6.6, 0.32)	0.2 (0.1–0.4, 0.17)
M. macedonicus	5.9 (5.8–6.1, 0.17)	0	6.6 (6.3–6.9, 0.31)
Cretan *Mus*	0.5 (0.4–0.6, 0.10)	5.8 (5.5–6.0, 0.26)	0

that reported for other cases of congeneric rodent taxa (Ellis and Maxson 1980; Nikoletopoulos et al. 1992). In a previous study (Nikoletopoulos et al. 1992). In a previous study (Nikoletopoulos et al. 1992) we have already proposed an evolutionary rate for the rodent albumin, equal to 100 amino acid substitutions per 16–20 million years. According to this rate the lineages leading to *M. macedonicus* and *M. m. domesticus* must have separated about one million years ago (Lower-Middle Pleistocene). The oldest known fossils of *M. macedonicus* in Israel have been dated to only 0.12 million years (Auffray et al. 1988) but paleontological and morphometric data (Thaler 1986) and data on DNA-DNA hybridization (Catzeflis et al. 1987) indicate that *M. spretus* (the feral mouse of SW Europe and N Africa) and *M. m. domesticus* diverged 1–3 million years ago. Combining all this information we conclude that both feral mice taxa of the circum-Mediterranean area may have evolved at about the same time; these speciation events possibly took place in south Asia, the area of origin of *Mus* from where mice spread westwards to the Middle East and Europe (for a review on the evolutionary history of *Mus* see Auffray et al. 1990 c).

The value of the two ratios, H + B/TL and ZC, for the discrimination of *M. macedonicus* and *M. m. domesticus* has already been established from studies on Bulgarian and Israeli populations (Auffray et al. 1988, 1990 b; Gerasimov et al. 1990). Data on these ratios coming from a mixed Greek-Bulgarian sample (containing only a few specimens from Greece) were given by Orsini et al. (1983), but this study support the usefulness of these ratios in a more ample Greek material. It is clear that our values for H + B/TL and ZC are lower and higher, respectively, than those from the literature, but both of them are surprisingly close to values obtained for mice from Israel. Auffray et al. (1990 b) commenting in the relatively longer tail of *M. macedonicus* from Israel in comparison to its European conspecifics, attributed this difference to the warmer climatic conditions of Middle-East, as expected from Allen's rule. However, our results for both species studied cause us to question this idea, since the Greek climate is generally cooler than that of Israel. So, in the absence of a really adequate data set, we believe that variation in tail length in *M. m. domesticus* and *M. macedonicus* are more likely due to random intraspecific variation than to climatic factors.

As well as making use of morphological ratios to discriminate *M. m. domesticus* and *M. macedonicus*, we also constructed a discriminant diagnostic key between these taxa (see Gerasimov et al. 1990). From stepwise discriminant analysis, the equation $y = 1.262 \times \log TL - 0.574 \times \log CBL - 0.261 \times \log LMSL - 0.447 \times \log DL - 0.352 \times \log(H + B)$ provides means of 0.523 for *M. m. domesticus* and −3.197 for *M. macedonicus*.

Since no differences were found between the mice of Patra and the Ionian islands, the mice of the latter sample are thought to belong to the same taxon *M. m. domesticus*. It should be noted that the occurrence and the taxonomic status of the Strofades mice was completely unknown until our study. Regarding the Zakynthos island the previous infor-

mation was controversial. Ondrias (1966) believed that this island is inhabited by *M. musculus spicilegus* (that is, *M. macedonicus* according to the current taxonomic nomenclature), while later studies (Fraguedakis-Tsolis et al. 1986; Giagia et al. 1995) revealed that only *M. m. domesticus* exists on this island.

Contrary to the older opinion classifying the Cretan *Mus* into the distinct subspecies *M. m. praetextus*, the results of the present study do not strongly support such a differentiation. So, although the MANOVA results were significant, the homogeneous character of the Cretan mice as compared to the heterogeneity of the Patra sample (reasonably being ascribed to the smaller sample size –24 vs. 116 individuals) plays an important role in tests of significance. Moreover, there is no difference between Patra and Crete mice in terms of morphological ratios that express the "shape" of the individuals.

The addition of further island mice (Dodecanisa) from an area close to Crete and known as a part of the *M. m. praetextus* range (Ondrias 1966), offered more information about the relationships of "*praetextus*" mice to *M. m. domesticus*. In fact, as it appears from the Mahalanobis' distances, Dodecanisa mice are morphometrically closer to the more geographically distant *M. m. domesticus* from Patra and the Ionian islands than to the nearby Cretan animals. The morphometric similarity between *M. m. domesticus* and mice assigned to *M. m. praetextus* is also evident from our statistical comparison of raw data cited by Reichstein (1978) (see the "Results" section). Moreover, the co-evaluation of the data taken from the analysis of the Antikythira sample (the existence of *Mus* on this island is reported in this study for the first time) contributes to a smoothing out of differences among all samples, if we except that of *M. macedonicus*.

Conclusively, we can say that all of our morphometric data converge to the view that only the Macedonian sample is morphometrically distinct. The small differences revealed among the remaining samples are insufficient to classify them into more than one taxa. This is also corroborated by the extremely low immunological distance between *M. m. domesticus* and the Cretan *Mus*.

Correlating all the above mentioned findings we conclude that the Patra and all insular populations studied should belong to *M. m. domesticus*. This is in accordance with the conclusions of Britton-Davidian (1990) who biochemically proved that *M. m. praetextus* from Algeria, Tunisia and Israel is not a valid taxon and should be included within *M. m. domesticus*.

Paleontological evidence shows the occurrence of *Mus* in the area of Greece since the Middle Pleistocene (Van de Weerd 1973; Storch 1975; Mayhew 1977). Auffray et al. (1990 c) have stressed that at the end of Pleistocene Crete was possibly the only European area inhabited by *Mus*, namely the taxon *M. minotaurus* fossil material of which was found in the uppermost Pleistocene deposits of Crete (Mayhew 1977). *M. m. domesticus* appeared in the Middle-East Mediterranean coasts about 12,000 years ago, and in its progression into Europe it colonized Greece during the Late Holocene, about 8500–8000 years ago (Auffray et al. 1990 c). If the endemic *M. minotaurus* continued to exist on Crete during Holocene time, then the present–day Cretan mice constitute the result of an interaction between the older, local *Mus* form and *M. m. domesticus* which was unintentionally dispersed by man from the mainland to all the Greek islands, including Crete. It could be speculated that this interaction led to a subsequent competitive exclusion of the possibly more susceptible *M. minotaurus* or to its extinction through introgression events. Such evolutionary processes could be responsible for the final production of an island mouse form very similar to the mainland *M. m. domesticus*.

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Zusammenfassung

Morphologische und immunologische Beziehungen zwischen einigen griechischen Mus L. Populationen (Mammalia, Rodentia, Muridae).

Einige Populationen freilebender Hausmäuse aus Griechenland wurden morphologisch und immunologisch untersucht. Ziel der Studie war es, neue Informationen über die beiden vom Festland bekannten Taxa der Gattung *Mus* zu gewinnen und ihre phylogenetischen Beziehungen zu einigen Inselpopulationen zu klären. Die morphologisch klare Trennung von *Mus musculus domesticus* und *Mus macedonicus* konnte bestätigt werden. Der albuminimmunologische Abstand ID zwischen diesen beiden Taxa betrug 6 Einheiten, was eine Trennungszeit von 1–1,2 Millionen Jahren bedeuten würde. Unsere Resultate stützen nicht die verbreitete Auffassung, dass auf Kreta und anderen Inseln der Ägäis das Taxon *M. musculus praetextus* vorkommt. Die untersuchten insulären Hausmäuse unterschieden sich nicht von *M. musculus domesticus* und sollten daher als solche klassifiziert werden. Paläontologische Daten und die vermutliche Evolutionsgeschichte der Hausmäuse in der südlichen Ägäis werden ebenfalls besprochen.

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