New records and karyotypes of small mammals from Jordan

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Abstract

Presented new distributional records for 14 species of mammals in Jordan. Of these, two species of bats are new to the fauna of the country, *Myotis capaccinii* and *M. emarginatus*. Karyotypic data are presented for 11 species that have not been previously studied from Jordan. The diploid number in *Rhinolophus hipposideros* from Jordan is different from that reported for European specimens. The rare *Gerbillus nanus* is confirmed in Jordan by karyotypic data. *Acomys lewisi* has the same chromosome number as *A. russatus*, a fact which is compatible with the idea that these two forms are conspecific.

Introduction

The mammals of Jordan have received little attention from zoologists, probably as a result of the unstable political situation there over the past several decades. Jordan encompasses diverse habitats from Mediterranean forested regions in the north to subtropical habitats in the Jordan Valley, and to arid regions of the Syrian Desert in the east. These varied major ecological units are expected to harbor a rich fauna and flora at least comparable to that in Egypt and Palestine, and the three regions provide an exchange route for mammals of Africa, Arabia, and Asia (Atallah 1978; Qumsiyeh 1985). No detailed survey of the mammalian fauna has been carried out, and no karyotypic information is available for any of the local species. The few papers that have dealt either directly or indirectly with some aspects of the biology of mammals in this region have pointed out the zoogeographic importance of Jordan and the need for future work there (Harrison 1964, 1968, 1972; Atallah 1978; Qumsiyeh 1980).

During two recent trips to Jordan (January-February 1981 and December, 1983-January, 1984), we collected rodents and bats that provide additional information on mammalian distribution in the eastern Mediterranean region. We also karyotyped several species on the latter trip, and some of the karyotypes produced are new or are different from those previously reported for the same species from Europe and other areas. The karyotypic and distributional data presented here illustrate the need for a survey of the fauna in general and of the mammals in particular, especially in light of the rapid economic and political developments in the region which are strongly affecting the local ecology.

Materials and methods

Rodents were karyotyped in the field by the yeast stress method of Lee and Elder (1980). After standard slides were made in the field, cell suspensions in fixative were frozen in liquid nitrogen for later use in G- and C-band chromosomal studies being conducted by the first author. Karyotypes of bats were obtained from primary cell cultures of biopsies taken in the field (see Baker and Qumsiyeh 1985). Voucher specimens are deposited in the Carnegie Museum of Natural History (CM), The Museum, Texas Tech University (TTU), and Jordan University Museum of Natural History (JU).

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Only specimens deposited at TTU resulting from the most recent trip were karyotyped. Localities are listed by governorates followed by the specific locality. Skin and skull measurements are presented as in Harrison (1964, 1972).

Results and discussion

Rousettus aegyptiacus E. Geoffroy St.-Hilaire

Specimens examined: Irbid, El Hamma, unnamed cave on south bank of Yarmouk River (CM 3 ♂♂, 1 ♀).

A colony of Egyptian fruit bats numbering at least 3000 individuals was located in a cave on the Jordanian side of the Yarmouk River. The measurements of the specimens collected fall within the ranges reported for the nominate subspecies in Egypt and Palestine (Qumsiyeh 1985). *Rousettus aegyptiacus* has become a common species in Jordan in the past few years, probably as a result of increased agriculture (Qumsiyeh 1980).

Rhinopoma hardwickei Gray (2N = 36, FN = 68)

Specimens examined: "West Bank of Jordan", Jericho, Mt. Quarantania (TTU 6 ♂♂, 4 ♀♀; CM 1 ♀).

Previously reported from Jordan by Harrison (1964), this species was collected from Mt. Quarantania near Jericho on the west bank of the River Jordan. The karyotypes of two males from this locality are indistinguishable from those reported from India by Ray-Chaudhuri et al. (1968).

Rhinopoma microphyllum Brunnich (2N = 42, FN = 66)

Specimens examined: Jordan Valley, Tabqat Fahl (TTU 1 ♂, 2 ♀♀).

The forearm measurements of the three specimens collected were 61, 63, and 65 mm, respectively. Greatest length of the skull for the largest specimen was 20.7 mm. These measurements and others taken agree with material from Egypt (Qumsiyeh 1985). The karyotype of a female is presented in Fig. 1; it is different from that of the smaller species

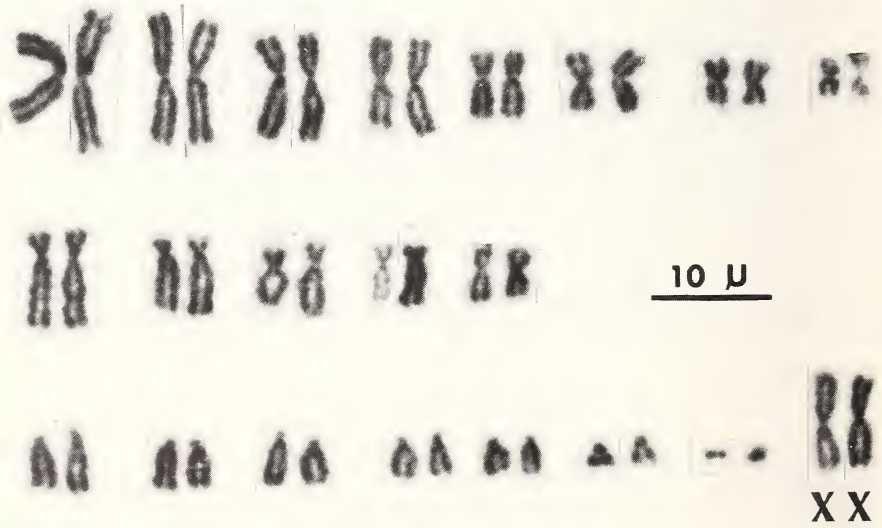

Fig. 1. Karyotype of a female (TTU 40521) *Rhinopoma microphyllum* from Tabqat Fahl, Jordan Valley

R. hardwickei. Karyotypic differences between the two species consist of three fusion/fission events and two inversions (Qumsiyeh and Baker 1985). These differences provide an additional method to distinguish the two morphologically similar species (Hill 1977; Qumsiyeh 1985).

Rhinolophus blasii Peters (2N = 58, FN = 60)

Specimens examined: Karat, 5 km NNE Feinan, El Mata cave (CM 9 ♂♂, 5 ♀♀); Jordan Valley, Tabqat Fahl (TTU 5 ♀♀); Irbid, Jerash Refugee Camp (TTU 1 ♂, 2 ♀♀).

This species was reported from norhtern Jordan by Qumsiyeh (1980). At Et Mata cave, located 5 km NNE Feinan, near Wadi Araba, contained a colony of about 30 bats. This is the southernmost record of the species in the eastern Mediterranean region (see Atallah 1978, for records in the region). The karyotype of three specimens from Jerash Refugee Camp is indistinguishable from karyotypes of this species reported from Europe (Dulić 1966). The X chromosome is a large metacentric and the Y a small acrocentric chromosome.

Rhinolophus ferrumequinum Schreber (2N = 58, FN = 60)

Specimens examined: Irbid, Dibbine National Forest, (TTU 10 ♂♂, 10 ♀♀; CM 1 ♂); Khirbat Sa'ad, near Nadira (CM 1 ♂).

This species occurs in the forested (Mediterranean) areas of Jordan (Atallah 1978; Qumsiyeh 1980). The karyotype of this species is like that reported from Europe (Bovey 1949; Capanna and Civetelli 1964; Dulić 1966), North Africa (Baker et al. 1975), and Japan (Ando et al. 1983) and is also indistinguishable from that reported for *R. blasii.*

Rhinolophus hipposideros Bechstein (2N = 58, FN = 60)

Specimens examined: Irbid, Dibbine National Forest (TTU 1 ♂, 1 ♀; CM 2 ♀♀).

This species was recorded from Jordan by Qumsiyeh (1980). Matthey and Bovey (1948) reported a 2N = 54 for *R. hipposideros* in Europe. However, Capanna et al. (1967), Matthey (1968), and Zima (1982) showed that the correct diploid number for European populations is 56 (FN = 60). The diploid number of a female from Dibbine Forest in Jordan was 58 (FN = 60), which is similar to that of other species of *Rhinolophus* (for example *blasii, ferrumequinum*) but different from the diploid number reported for *R. hipposideros* from Europe. Because the fundamental number is the same in both karyotypes, this suggests that the cytotype that occurs in Europe is characterized by a fusion of two acrocentric chromosomes.

Myotis capaccinii Bonaparte

Specimens examined: Jordan Valley, Tabqat Fahl (TTU 1 ♀).

This is a new record for Jordan. Qumsiyeh (1980) previously recorded *Myotis nattereri* from Jordan. The measurements of this specimen are presented as follows. Total length, 92, tail length 34, hindfoot length 14, ear length 14, forearm length 42.6, greatest length of the skull 15.5, condylobasal length 13.4, breadth of braincase 7.7, zygomatic breadth 9.1, upper toothrow length 5.5, mandible length 13.9. The specimen is similar in color to those from Lebanon and Palestine identified by Harrison (1964) as *M. c. bureschi.*

Myotis emarginatus E. Geoffroy St. Hilaire

Specimens examined: Irbid, Dibbine National Forest (CM 1 ♀).

Because this is a rarely encountered species in North Africa and the Middle East, the measurements of this specimen are presented as follows. Total length, 97, tail length 45,

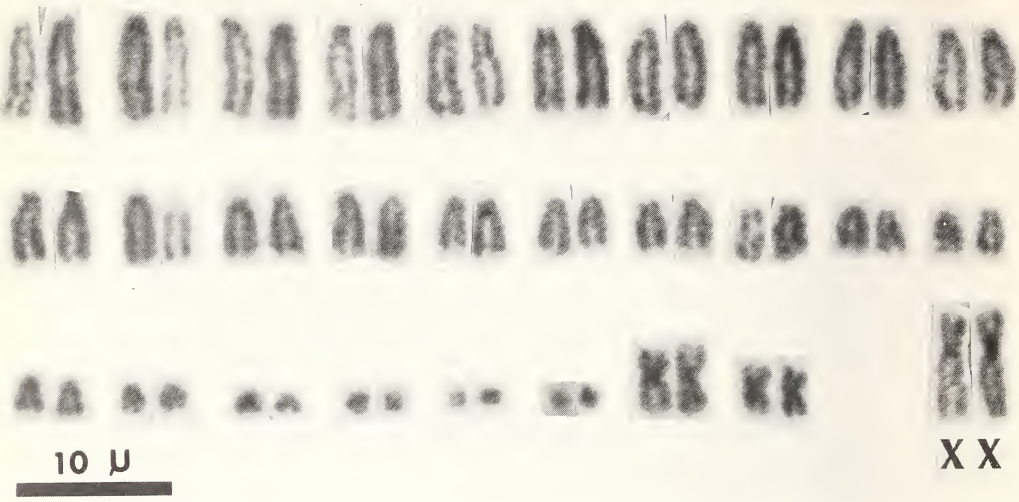

Fig. 2. Karyotype of a female (TTU 40552) *Rhinolophus hipposideros* from Dibbine National Forest

hindfoot length 9, ear length 18, forearm length 42.5, greatest length of the skull 16.6, condylobasal length 14.1, breadth of braincase 7.7, zygomatic breadth 10.0, upper toothrow length 6.4, mandible length 11.4. These measurements and the color of this specimen indicate that it belongs to the nominate subspecies occuring in Europe and North Africa (Harrison 1964; Atallah 1978).

Gerbillus dasyurus Wagner (2N = 60, FN = 66, 68, 70)

Specimens examined: Jordan Valley, Ghor Nimrin (TTU 1 ♂); Lava Rocks S Azraq ed Druz (TTU 8 ♂♂, 10 ♀♀; CM 5 ♂♂, 1 ♀); Amman, Shawmari Wildlife Reserve, Azraq Depression (CM 1 ♀); Southern, Aqaba, Wadi behind Marine Research Station (TTU 1 ♂).

This is a common species in Jordan; for a review of its distribution in the eastern Mediterranean region see Atallah (1978). The diploid number for all specimens examined from Jordan was 60 which is consistant with previous reports. However, the fundamental number varies from 66 and 68 (in Azraq Oasis) to 70 (in Ghor Nimrin). Wassif et al. (1969) reported a FN = 69, 70 for Egyptian specimens, Lay and Nadler (1975) recorded FN = 68 for Sinai specimens, and Wahrman and Zahavi (1955) listed both 66 and 68 for the Sinai. The mean and range of measurements of 5 males and 5 females from Azraq ed Druz were as follows. Total length, 195.4 (170–213), tail length, 117.7 (110–130), hindfoot length, 24.5 (23–26), ear length, 13.3 (12–14), greatest skull length, 27.3 (26.3–28.2), zygomatic breadth, 14.2 (13.6–14.8), interorbital width, 4.8 (4.6–5.1), braincase width, 13.0 (12.8–13.2), upper toothrow length, 3.8 (3.6–3.9), lower toothrow length, 3.7 (3.6–3.9), mandible length, 14.7 (14.3–15.0).

Gerbillus nanus Blanford (2N = 52, FN = 60)

Specimens examined: Southern, Aqaba, Wadi behind Marine Research Station (TTU 1 ♂); Wadi Araba, Wadi El Khanazir (CM 1 ♂, 1 ♀); Amman, Azraq Oasis, Ain El Atmash (TTU 3 ♀♀).

Diploid numbers of Jordanian specimens agree with those reported from Israel (Wahr-

MAN and ZAHAVI 1955), Tunisia (JORDAN et al. 1974), and Morocco (LAY et al. 1975). The number of biarmed autosomes varies from eight in North Africa to 10–14 in Israel and Jordan and is probably due to addition of heterochromatic arms. The X chromosome is a large submetacentric and the Y a small submetacentric chromosome. ALLEN (1915) and BODENHEIMER (1935) referred specimens from Aqaba to *Dipodillus quadrimaculatus,* which is a synonym of either *G. nanus* or *G. dasyurus.* Both HARRISON (1972) and ATALLAH (1978) reported only *G. dasyurus* from Jordan. These two species are similar morphologically but have different diploid numbers. The mean and range of measurements of the four specimens at TTU of *G. nanus* were as follows. Total length, 185 (170–200), tail length, 114.7 (110–122), hindfoot length, 24.5 (23–25), ear length, 14.3 (12.5–15.5), greatest skull length, 26.8 (25.4–28.4), zygomatic breadth, 14.3 (13.6–14.7), interorbital width, 4.8 (4.6–5.2), braincase width, 13.9 (13.6–14.0), upper toothrow length, 3.6 (3.4–3.8), lower toothrow length, 3.6 (3.5–3.7), mandible length, 13.9 (13.3–14.5).

Meriones crassus Sundevall (2N = 60, FN = 70)

Specimens examined: Amman, Azraq Oasis, 5 km W Azraq Shishan (TTU 1 ♂); Southern, Wadi Araba, Wadi El Khanazir (CM 1 ♂, 1 ♀).

NADLER and LAY (1968) reported 2n = 60, FN = 68 (10 biarmed autosomes) for specimens from Iran and Egypt. The karyotype of the single male from Azraq Oasis is similar to the aforementioned specimens but has 12 biarmed autosomes (FN = 70). The X chromosome is a large submetacentric chromosome and the Y is a small submetacentric. According to ATALLAH (1978), who lists other localities of record in Jordan, the Jordanian material belongs to the nominate subspecies.

Meriones shawi Duvernoy (2N = 44, FN = 74)

Specimens examined: Amman, Al Halabat (TTU 1 ♂); Azraq Oasis, Shaumari Wildlife Reserve, 6 km S Azraq (TTU 1 ♀); Azraq Oasis, Ain Al Atmash (TTU 2 ♂♂, 1 ♀); Azraq Oasis, 5 km W Azraq Shishan (TTU 3 ♀♀).

Karyotyped specimens from Jordan have 12 acrocentrics, which is similar to what was reported by NADLER and LAY (1968) from Egypt. The X chromosome is a large metacentric chromosome, a condition that distinguishes this species from *M. libycus* which is otherwise similar karyotypically and in external morphology. It seems from our material that only *M. shawi* occurs in Jordan although HARRISON (1972) and ATALLAH (1978) recognized only *M. libycus* as occurring in the eastern Mediterranean region.

Meriones tristrami Thomas (2N = 72, FN = 76–80)

Specimens examined: Amman, Al Muwaqqar, 14 mi E. Amman (JU 1 ♂); Northern, 10 km E Irbid on Irbid-Mafraq highway (TTU 3 ♂♂, 5 ♀♀); Jordan Valley, Ghor Nimrin, near King Hussain Bridge (TTU 2 ♂♂).

BENNAZOU et al. (1982) reported a fundamental number of 72 on the one female they examined. KOROBITSYNA and KORABLEV (1980) reported that the number of biarmed autosomes in this species in Armenia and Transcaucasia varies from 6 to 19 due to variations in heterochromatic short arm additions. This is also true in Jordanian material, in which the number of heterochromatic short arm additions varies from 6 (Al Muwaqqar) to 10 (10 km E. Irbid). The X chromosome is a large submetacentric and the Y a small acrocentric. For additional localities in Jordan see ATALLAH (1978).

Fig. 3. Karyotype of a male (TTU 40603) *Meriones tristrami* from 10 km E. Irbid. X and Y chromosomes in bottom right-hand corner

Psammomys obesus Cretzschmar (2N = 48, FN = 74, 75)

Specimens examined. Amman, Al Muwaqqar, 22 km E Amman (TTU 2 ♂♂, 3 ♀♀); Al Halabat (TTU 1 ♂, 1 ♀).

The fat-tailed jird is a common species in Jordan but is difficult to collect because it will not enter traps. We have collected this species (and occasionally others) by flooding them out of their burrow systems on the sides of soil mounds or small road-side or railroad "hills". The karyotype of this species consist of 18 acrocentric or telocentric autosomes and 28 biarmed autosomes. One male specimen from Al Halabat had 29 biarmed autosomes. This is due to the presence of a heterochromatic short arm addition on the smallest autosome in a polymorphic condition (Qumsiyeh 1986). The X chromosome is the largest metacentric chromosome in the complement and the Y is a medium sized metacentric.

Acomys cahirinus (Desmarest) (2N = 38, FN = 68)

Specimens examined: Southern, Aqaba, Wadi behind Marine Research Station (TTU 2 ♂♂, 1 ♀).

Wahrman and Goitein (1972) reported two cytotypes of this species in Palestine and Sinai. On a narrow stretch of land in eastern Sinai, the northern race (2N = 38) hybridizes with the southern (Sinai) race (2N = 36). We collected specimens from a Wadi behind the Marine Research Station south of Aqaba almost on the other side of the Gulf of Aqaba from the hybrid zone and all had a diploid number of 38.

Acomys lewisi Atallah (2N = 66, FN = 76)

Specimens examined: Amman, Azraq, Lava Hills S Azraq ed Druz (TTU 2 ♂♂, 2 ♀♀; CM 5 ♂♂, 1 ♀).

The karyotype of this species is indistinguishable from that of *Acomys russatus* Wagner and is compatible with the notion that *A. lewisi* may be a subspecies of *A. russatus* (Harrison 1972). Because of the striking color and bacular morphology (Atallah 1967), we continue to use the name *A. lewisi* pending further studies.

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Zusammenfassung

Neue Nachweise und Karyotypen von Kleinsäugern aus Jordanien

Für Jordanien werden erneute Nachweise von 14 Kleinsäugerarten erbracht. Davon sind 2 Fledermausarten Erstnachweise in der Fauna dieses Landes: *Myotis capaccinii* und *M. emarginatus*. Von 11 Arten werden aus Jordanien erstmalig karyotypische Daten vorgestellt. Dabei hat sich ergeben, daß der diploide Chromosomensatz für *Rhinolophus hipposideros* aus Jordanien von dem europäischer Vertreter abweicht. Ferner wird der seltene *Gerbillus nanus* durch karyotypische Daten auch für diese Region belegt, und *Acomys lewisi* zeigte die gleiche Chromosomenzahl wie *A. russatus*. Möglicherweise sind beide Formen einer Art zugehörig.

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Tupaia glis (Diard, 1820) in Bangladesh[1] (Mammalia: Scandentia: Tupaiidae)

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Abstract

Discussed is the distribution and taxonomic classification of tree-shrews, *Tupaia glis*, in Bangladesh. A small series of specimens identified as *T. g. assamensis* has been taken from central Bangladesh, representing the westernmost range extension into the lower Ganges-Brahmaputra plain. Field observations on reproduction and number of teats agree with the findings of previous authors.

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