

Tortoise Drain in Morocco

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More than 300,000 tortoises are exported every year from Morocco to Britain for pets. To find out the effect of this trade on the populations in the wild, the author, aided by a grant from the FPS/WWF Revolving Fund, searched the known tortoise areas in Morocco, weighing and measuring all he found. In his six weeks in the field he found only 23 tortoises. For the country as a whole he estimates numbers to be of the order of five million, a very thin spread over a large area of ground. But the trade may have a more serious effect than just reducing numbers. Because only tortoises of 4-6 inches (under-shell measurement) are wanted, the collectors concentrate on these, which often leaves small mature males to mate with very large mature females. If they are unable to do so it could seriously affect reproduction rates.

Until a few years ago common tortoises *Testudo g. graeca*—in Arabic *facron*—were collected in Morocco mainly from the region of Casablanca, the exporting centre. Today they are very scarce in this region, and to satisfy a trade which every year exports over 300,000 tortoises to Britain they are collected all over Morocco. The collectors are mostly shepherds who bring the tortoises in to provincial collecting centres along with their animals on the weekly market days and get about six-pence for each one. The tortoises are then sent in sacks, in vans or on top of public buses, to Casablanca, from where, because they are too heavy for air freight—3000 tortoises weigh about a ton—they are sent by sea, packed in baskets stowed upright on deck. The seamen, with uncertain humanity, spray the baskets with sea water to prevent the creatures from roasting in the sun. In this way between 10,000 and 25,000 tortoises are dispatched to London once a fortnight. The mortality rate is only about one per cent.

When I arrived in Morocco in March there had been severe flooding, the result of two months' prolonged rain. This had probably reduced the tortoise populations in the north of the country, and delayed their emergence from hibernation. A further period of cold, wet weather in late March and early April kept them still longer in their refuges, but dealers had continued to collect, although one commented that the year had not been a good one so far.

My first month was spent contacting dealers in Casablanca and scientists in Rabat, in the Institut National de la Recherche Agronomique and the Faculté des Sciences of Mohammed V University; in making an initial investigation on the types of habitats that yielded tortoises with an approximation of their density, talking with local inhabitants and searching for myself. The second month was spent co-ordinating information, investigating the localities where tortoises are being collected, and analysing them.

The tortoise trade, which began to build up after the second war, has been discussed by Dr. F. Jean Vinter and Mrs. Monica Green in a

paper edited by Graham-Jones (1961). Three dealers, all Jewish or Italian Moroccans, handle tortoises in Casablanca, only one of them in large numbers; for the other two, tortoises are a subsidiary line. The largest dealer was very forthcoming about the collecting centres; the others feared that I wanted the facts in order to start up in competition. The large dealer had 10,000 animals in stock collected from 14 centres and kept in reasonably good conditions. The others had 1000 and 500 from one and eight centres respectively, although the second one probably had more elsewhere.

My route was based primarily on the known distribution of the tortoises, taking weather conditions into account. In little-known areas I made excursions to search and enquire of local inhabitants whose advice was generally accurate.

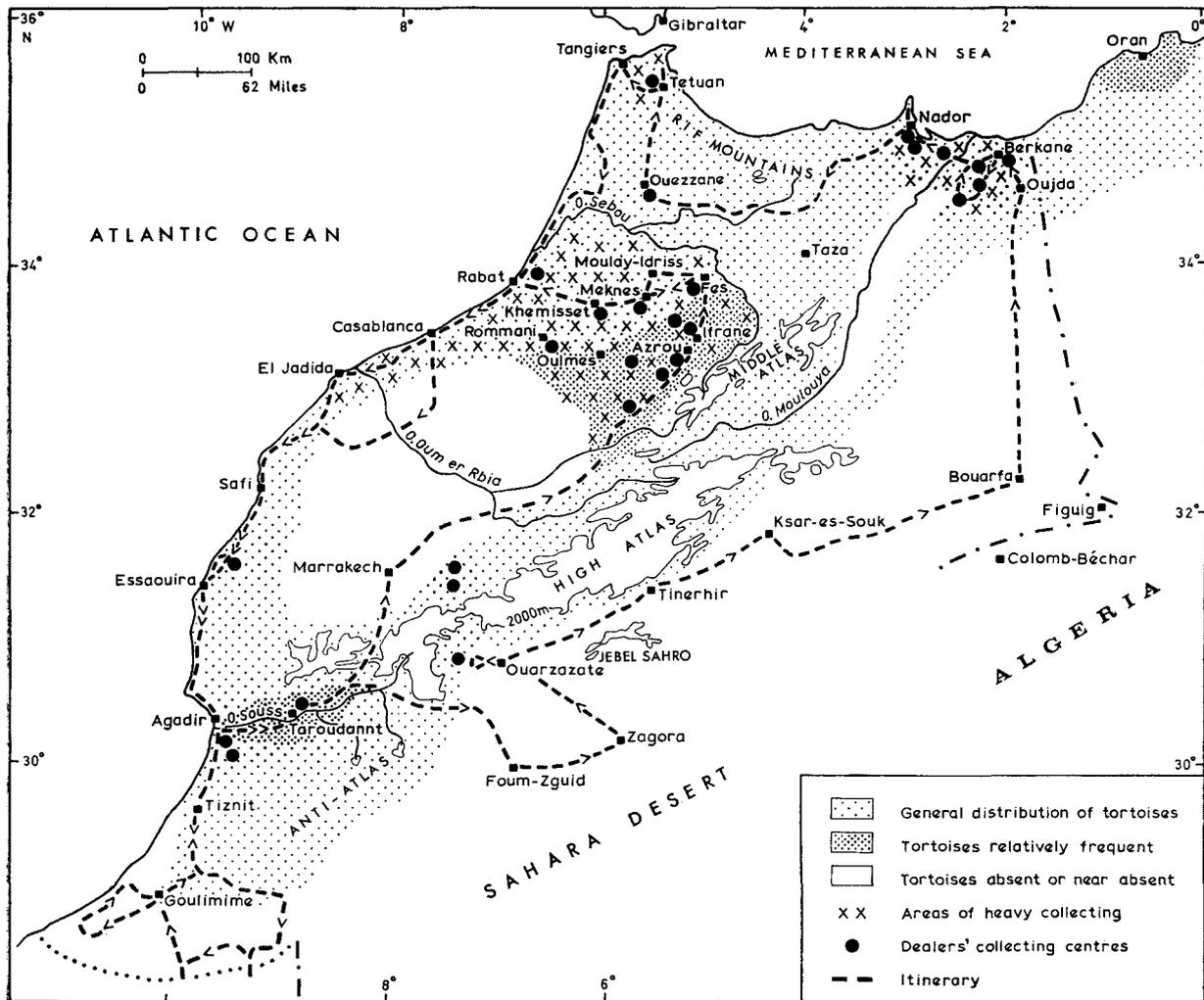
According to Bons (1958) tortoises occur throughout Morocco up to about 6000 feet, except to the south-east of the High Atlas mountains. They need damp or fairly damp conditions, where there is vegetation and also soft herbaceous food plants most of the year (see map). They are absent from oases and the warm hamada regions of south and south-east Morocco.

Population Estimates

Guided by previous experience of Hermann's tortoise *T. hermanni* in Yugoslavia and the very dense populations of the common Greek tortoise in Turkey, I planned to compare the size and number of tortoises in an uncollected area with a collected area. However, this proved impossible, partly because wherever tortoises are numerous in Morocco collecting has taken place at some time, so the results could not be compared with an uncollected area; partly because tortoises were never abundant even in favourable conditions: usually only one or two were found after two or three hours' careful searching, and this was too few for any statistical comparison; and partly also because their habitat varied from open forest to low scrub with dense ground cover. There were also variations in the ground area covered per unit of time, so that area estimates were difficult to assess. Tortoise density was therefore defined in terms of the number found and the time taken. These are the vital factors for the tortoise collector.

Seventy man-hours were spent collecting in 36 known tortoise localities; of these only 11 yielded tortoises, the total being a mere 23 animals. The average time taken to find one tortoise was just over three hours; they were considered relatively abundant if it took less than 45 minutes. It was easier to find them in the morning, when they were sunning themselves, than in the afternoon when they retreated to the shade; experience showed that tortoises have favoured basking sites.

Only in one place were they found in any numbers. This was in the Souss Valley of S Morocco, 20 kilometres (12 miles) west of Taroudannt, where seven animals were collected in four hours. A dealer told me that, communications being difficult, he had not collected in this region for the last eight years, so perhaps the relative abundance was the result of his lassitude. On the other hand, tortoises were absent from other parts of the Souss Valley, so perhaps it was chance that they had



not been collected in this particular place, or that in natural populations tortoises tend to aggregate in a favourable region.

Near Moulay-Idriss, just north of Meknes, five tortoises were found after six man-hours of searching. Possibly here too, little collecting had taken place, although the region in general between Khemisset and Fes has been well collected by dealers. This was borne out by collecting near Khemisset, for many years a centre, where one tortoise was found after only 30 minutes of searching the most likely places. This and three other animals, found in the same place by a shepherd's boy who had them dangling on lengths of grass wound tightly round their hind legs, were all under six years of age. (Approximate age is calculated by counting the number of rings making up the shields on the shell.) This suggests either that collectors do not select obviously young tortoises, which indeed they should not do, or that, if they are a representative fraction of the overall population, the species can make up its numbers quite rapidly once left undisturbed (see fig. 1). One dealer, at least, had not collected from this region for the last five years on account of scarcity.

Tortoise Density

A rough estimate was made of the density of tortoises per unit area. Between three and six kilometres were covered in each hour of searching over a width of 2 to 12 metres. These figures varied greatly with the character and vegetation of any particular area. In the areas searched the density of tortoises ranged from 5 to 56 per square kilometre. The mean total area inspected was around 270 hectares. This included favourable, lightly cultivated and undeveloped country areas where tortoises are known to occur. There were 10 tortoises per square kilometre in the Souss Valley between Ait Melloul and Taroudannt in S Morocco and only 5 in the heavily collected Nador/Berkane area of the Rif in NE Morocco. As only 23 tortoises were found in 20 days of solid searching, often with Moroccan assistants, it was difficult to estimate the total population for the whole country. But, with reservations, I estimate it at roughly five million, a very thin spread over an area of about 162,000 square kilometres which is the area occupied by tortoises in Morocco.

Size Range

In 1965, the Moroccan Government introduced restrictions on the number and size of tortoises exported by dealers, forbidding the export of tortoises with an under-shell of less than 10 centimetres (4 inches). Fortunately, British dealers have difficulty in selling tortoises with an under-shell longer than 15 centimetres (6 inches) because they frighten small children. Large specimens also take up a lot of space in the dispatch baskets resulting in a lower financial return. Of the 23 animals found, only 12 were in the size range (between 10 and 15 cms). This is 52 per cent; in the whole population 65 per cent is probably a truer figure for the animals suitable for export. The dealers discard the badly damaged animals.

The frequency of particular sizes of under-shells was determined for Morocco as a whole, and for the Taroudannt, Moulay-Idriss and Khemisset regions (fig. 1 below). The sex and maturity of the animals is



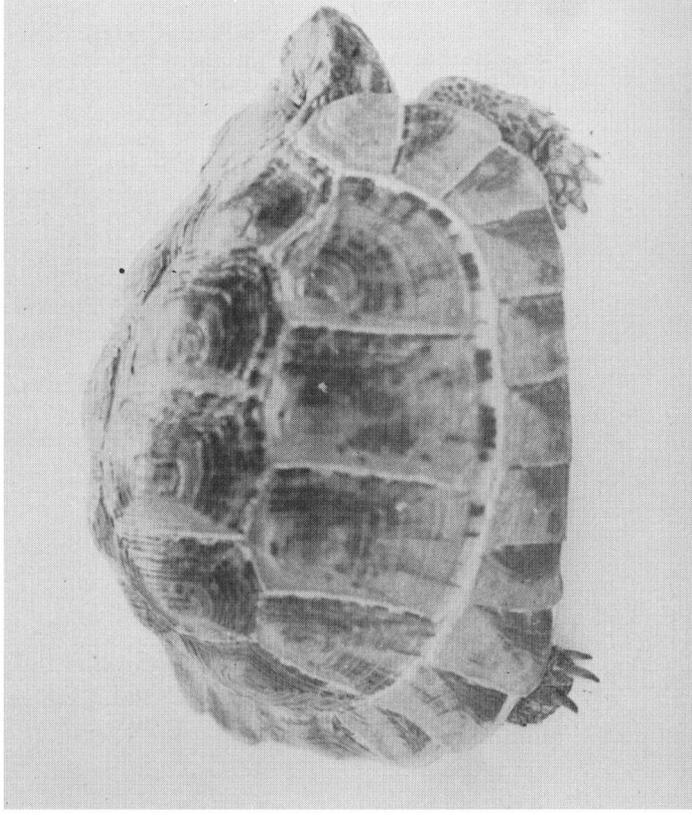
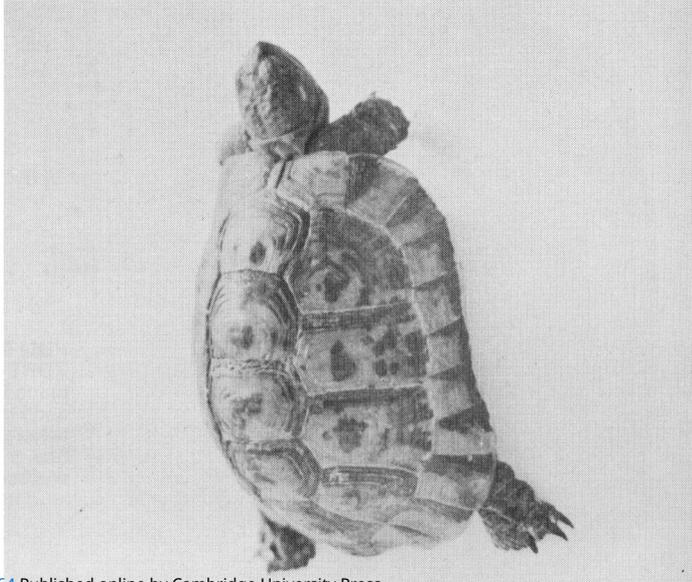
Plate 3

IN A MOROCCAN TORTOISE DEALER'S YARD. The women are de-ticking the tortoises before packing them in baskets for shipment to Britain. Photographs by M.R.K. Lambert



Plate 4 above: THE MOROCCAN TORTOISE. This large female was found near Moulay-Idriss, in central Morocco.

**Plate 5 below:
SMALL MALE AND LARGE FEMALE.** In areas that have been heavily collected, and the medium-sized tortoises removed, these may be all that are left to breed and are unlikely to succeed.



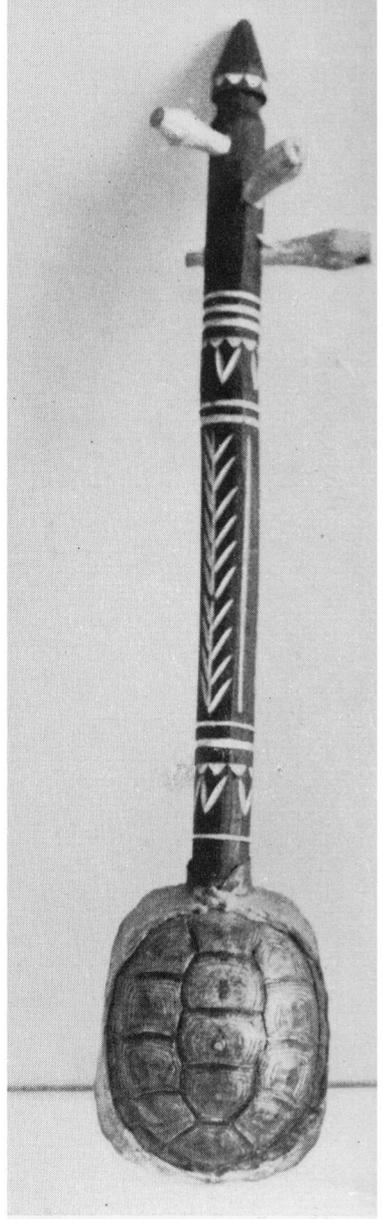
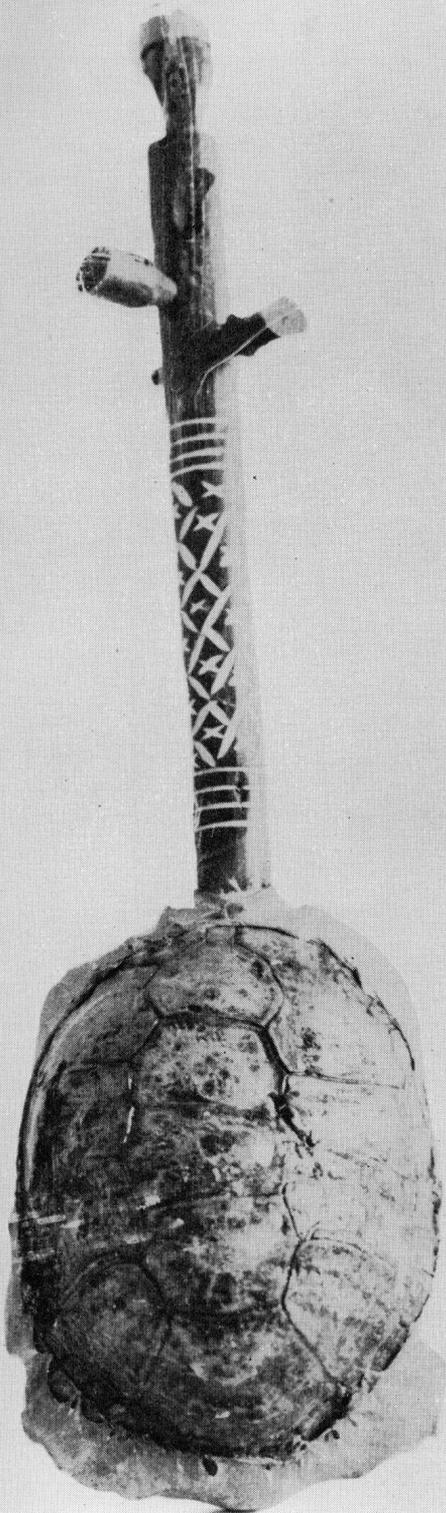


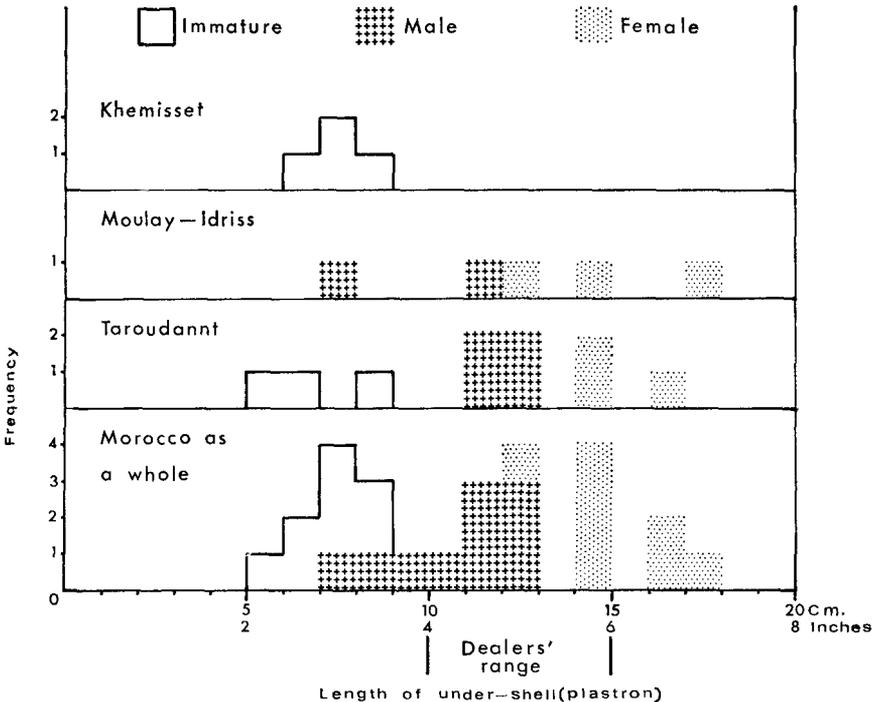
Plate 6
TORTOISE SHELL BANJOS,
made for tourists. The small
shell is too small for the
tortoise exporters; the large
one is the right size but too
cracked.

indicated and reveals an interesting point. The exporting size range of 4–6 inches excludes a proportion of small, mature males and very large mature females. If allowed to survive these may continue to breed, but miniature mature males left to mate with oversize females would probably fail to do so. The evidence suggests that copulation is only achieved in tortoises of roughly similar size. This is an important point affecting the rebuilding of the populations.

The Banjo Trade

In some Moroccan towns, the top-shell is utilised in the manufacture of a kind of banjo. The shell sizes are selected indiscriminately, and most of these poorly made instruments are sold to tourists at extortionate prices. In Tetuan alone, 7 to 10 guitars are made per day, which means that about 3,000 tortoises are used in a year: for Morocco as a whole this could mean an annual consumption of around 10,000 animals. Judging by the appearance of the top-shells, this trade may be carried on in

Figure 1



The frequency and the size range of the under-shell of the common tortoise in natural populations in Morocco. The size range of tortoises in Morocco as a whole is compared with relatively uncollected areas (Taroudannt and Moulay-Idriss) and with a heavily collected region (Khemisset). Note in Khemisset, size range is limited and all are immature.

conjunction with the tortoise exporters, for many of the shells were either small or large; the medium-sized ones showed signs of fractures, and were all shells that dealers in live animals would have discarded. So the very tortoises that conservationists would wish to be returned to their native habitats seem to have given rise to another trade that may have developed indirectly as the result of incomplete legislation.

Conclusions

Tortoises are still widely spread in Morocco as a whole, but are much more isolated than before the trade started. Though very sparse in places, they are not likely to become extinct. Fortunately the species' viability seems strong; copulation need only take place once every three years; the tortoises live to a great age, and the adults have few natural predators. Moreover, elsewhere in the damper parts of north-west Africa, they are abundant as there has been no or little collecting in Algeria or Tunisia. But it is difficult to guess the tortoises' future in Morocco if collecting is allowed to continue at the present high rate. In some areas the populations are virtually exhausted. Eventually, no doubt, scarcity will make the dealers' operations commercially uneconomic, and already there is some evidence of this. Extinction in Morocco could result if tortoises become so isolated that the chances of males meeting females for breeding purposes become remote.

Recommendations

1. Immediate tax levy on dealers importing tortoises from Morocco. The resultant increase in price might reduce the sale of tortoises for pets and consequently reduce the demand. A decrease in numbers exported would reduce the profit margin for Moroccan dealers, making the trade, which even now shows signs of being unstable, less attractive.
2. Legislation controlling the arrival of tortoises after the end of May. The long time that tortoises have to spend in hibernation in Britain, coupled with our cooler climate, makes tremendous demands on their body fat reserves. In the three winter months in Morocco tortoises will emerge and feed if the sun is warm. If tortoises arrived before the end of May and were allowed to feed properly from then on acclimatisation would be achieved and they would not be travelling at a time of year when they should be feeding. Moreover, this would reduce the number of animals that dealers could export.
3. Immediate control of the trade in tortoise-shell banjos in Morocco.
4. Legislation to ensure that under- or over-size tortoises are not collected, or, if brought to the dealers in Casablanca, are returned to the wild and not disposed of to the banjo trade or the nearest dump.

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