CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

Other proposals

A. Proposal

Transfer of *Geochelone sulcata* from Appendix II to Appendix I.

B. Proponent

France

C. Supporting Statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Chelonii

Sub-order: Casichelydia

Infra-order: Cryptodira

1.3 Family: Testudinidae

Sub-family: Testudininae

1.4 Genus and species: *Geochelone sulcata* (Miller, 1779)

This species is recognised by all herpetologists, especially after the review of the African Cryptodira tortoises by Loveridge and Williams (1957). There are no subspecies, but it seems that there is significant variation between rather fragmented populations, specifically between the western and the eastern populations.

1.5 Scientific synonyms: *Testudo calcarata* Schneider 1784

1.6 Common names: English: African spurred tortoise

French: Tortue sillonée

Spanish: Tortuga con púas

1.7 Code numbers: A-301.011.003.014

2. Biological Parameters

2.1 Distribution

From Mauritania and Senegal to Sudan, Eritrea and Ethiopia, this species is found in a band 500 kilometres wide between the isohyets of 200 and 800 mm; between 12° and 18° north latitude. The band descends to 4° north latitude in the Sudan and rises to 20° north latitude in Mali. The northern limit of its distribution is the Sahara Desert; the southern limit being less defined because this species is found in the Parc du W in Niger, where the climate is more humid. Its presence in Saudi Arabia and Yemen, where it was probably introduced, is not confirmed.

The remains of a land tortoise have been found in Quaternary deposits of the Pedra Lume crater on the Ilha do Sal in the Cap Verde Islands and were identified by Chevalier (1935) as being similar to those of a *G. sulcata*. In fact, those remains are from a close but distinct species, *Geochelone atlantica* (Lopez-Jurado, Mateo and Garcia-Marquez 1998).

Mauritania
According to a recent survey by Arvy (1997), distribution is now limited to the south-western part of the country in the provinces of Assâba, Brakna, Gorgol, Guidimaka, Trarza and also in western Hodh (Lambert 1996). There is a good density of tortoises in the Parc du Diawling.

Senegal
There are only a few remaining residual pockets of *G. sulcata* in northern Ferlo (north-eastern part of the country).

Mali
There are several hundreds in the loop of the Niger and in Dogon country. Others have been observed near Mpoti and Gao. They are also found at Douentza, Madougou, Mondoro, Soum (mare) and Dounapen, along the border with Burkina Faso (Diakité, personal communication to Lambert).

Guinea
There are no reports of this species in Guinea.

Burkina Faso
There are a few small relict populations in the Nazinga reserve and in the north near Mali in a triangle between Bamboulé, Katchirga and the Malian border (Madec, personal communication). There is also a population in the Singou reserve (Lungren, personal communication to Lambert).

Togo
There are reportedly specimens of this species in the north in the region of dry savannah. This is not confirmed. The tortoises exported to Togo come from neighbouring countries.

Benin
No recent information is available. Several specimens perhaps survive in the far north of the country in the Parc du W (Chirio, personal communication).

Niger
The Sahel environment is reduced. There are reports of several tortoises. However, there is a good density in the Parc du W (Moore 1997), 6000 specimens according to recent reports by loggers in Niger (Diagne, personal communication).

Nigeria
No recent information. Often reported as absent from Nigeria by authors. There is an unconfirmed report from a station near the Niger by Iverson (1992).

Cameroon
One tortoise reported by Scholte in 1996 in the Parc de Bénoué (personal communication). This was the only observation during seven years of field study between 10° north latitude and Lake Chad. There are still several specimens north of the Mendara Hills (Chirio, personal communication).

Chad
The population has plunged because of the war in Chad. There are tortoises in the uninhabited regions near the border with Niger and to the east of Nguigmi (Brahimi, personal communication to Lambert).

Central African Republic
There is a population in the Koumbala Reserve near Ndélé, Birao, between the villages of Tiroungoulou, Gordil and Délembé and the Parc National de Bamingui-Bangoran (Joger 199; Ngoubou, personal communication to Lambert). There are substantial but poorly known

populations north of the Central African Republic in the department of Vakaga (Chirio, personal communication).

Sudan
There are probably well-established populations in western Sudan in the Kordofan (Gasperetti et al. 1993). This species was reported by Iverson (1992) near Wadi Halfa in the extreme northern part of Sudan near the border with Egypt, but there are no reports of sightings in the extreme southern part of the country.

Eritrea
Presence in the north and west. One specimen was recently gathered near Asmara; also sighted at Barentu (Dewhurst, personal communication to Lambert).

Ethiopia
Little data, but scarce Sahel environment. Specimens were recently seen 10 kilometres south of the entrance to the Parc National Awash (8° 55' N, 40° 6' E) (Blashford-Snell and Goll, personal communication to Lambert).

Djibouti, Somalia
No reports; no information.

Saudi Arabia and Yemen
Perhaps introduced. The sites of observation reported by Gasperetti et al. (1993) were probably introduced specimens. Unconfirmed presence.

In light of recent information, it is possible to confirm that the distribution of the *Geochelone sulcata* has been drastically reduced and that it is more and more fragmented. This determination corresponds to criteria Bi and Biv for listing in Appendix I.

2.2 Habitat availability

The characteristic habitat of this species is the Sahel, indicated by the presence of Cram-cram (*Cenchrus biflorus*); more exactly the Sudan-Sahel region, where annual precipitation is between 140 and 1098 mm and corresponds to the following bioclimatic conditions, based on their xerothermic index (xi = number of physiologically dry days per year, in accordance with UNESCO-FAO 1963): desert (xi: 300-350), subdesert (xi: 200-300) to tropical hot and very dry (xi: 150-200) (Lambert 1993).

This land tortoise needs arid conditions and sandy ground in which to dig its burrow. Everyone is familiar with the advance of the desert to the south, drastically restricting the width of the band of the Sahel. Furthermore, the human population of the Sudan-Sahel has doubled or even tripled during several decades. Herds, the direct rivals of the spurred tortoise which is also a herbivore, are ten times more numerous. Armed conflict is frequent in the region and always very destructive of wildlife.

2.3 Population status

According to recent estimates, the total possible population of this species is probably between 18,000 and 20,000 specimens, distributed as follows: Mauritania, 3000, of which 1000 in the Parc du Diawling; Senegal, 2000; Mali, 1000; Burkina Faso, 50; Niger, 6000, almost all of which are in the Parc du W; Chad, 700; Central African Republic, 2000; Sudan, 4000, perhaps more; Eritrea, 500 (Devaux et al.). The largest populations are in Mauritania, south-western Niger in the Parc du W, Sudan and north of the Central African Republic.

Geochelone sulcata is a good-luck charm. There are probably several thousand African spurred tortoises in captivity in the area of distribution of the species, especially in Senegal, both in private possession and in the possession of zoos.

2.4 Population trends

According to Villiers, *G. sulcata* was very widely distributed in 1958 from southern Mauritania (Nouakchott) to Ethiopia and Eritrea (Villiers 1958).

Some scientists feel that the population of this species was about 100,000 tortoises fifty years ago.

In March 1995, Pritchard, a world specialist in tortoises, explored the Senegal River valley and reported an increase in the decline of the *Geochelone sulcata*. In October 1996, the British herpetologist Michael Lambert, a specialist in the *Geochelone sulcata*, explored north central Mali and in October 1996 with Bernard Devaux, the north and the north-east of Senegal, primarily the Ferlo which is the typical habitat of this tortoise, where he recorded an alarming decline in populations of *Geochelone sulcata* (Lambert 1993).

A drastic decrease in the number of African spurred tortoises corresponds to criterion Biv for listing in Appendix I.

2.5 Geographic trends

This species was once found throughout southern Mauritania, at least up to Nouakchott; it now occupies only the south-west (Villiers 1958). It was formerly widely distributed in Senegal, from Thiès, 100 kilometres t east of Dakar, to Saint-Louis and Tambacounda. There are now only a few residual populations in northern Ferlo.

In Mali, this species occupied a wide band of clear savannah and sand between Kayes and Menaka to the east of Gao. It was well known among the Dogon (Griaule 1954; Perolini 1988). It has now disappeared between the Senegalese border and the Niger River, as well as north of Tombouctou. In the southern part of Niger, between Niamey, Tahoua and Zinder, this species was once numerous. Now, they are almost no reports of sightings in this band of the Sahel. This species is becoming extinct in the Cameroon. In Chad, populations have dropped drastically because of the war in that country. There are large populations in Sudan, although urban expansion around Khartoum, war and famine have decreased their populations.

The disappearance of *Geochelone sulcata* from several parts of its range, fragments its distribution and reinforces the isolation of some populations. This situation corresponds to criteria Bi and Biv for listing in Appendix I.

2.6 Role of the species in its ecosystem

Geochelone sulcata is phytophagous. There are few phytophagous animals currently in the Sahel ecosystem and fewer and fewer hoofed animals. In areas where herds of domestic animals are abundant, this species appears to be more numerous as evidenced by the burrows it digs. The burrows facilitate composting in the soil (Diagne, personal communication). The Sahel soils are poor, and the African spurred tortoise stirs them up and provides manure. Its defecation contain seeds of Gramineae, date palms (*Balanithes aegyptica*) or of a small melon. Its burrow is a seed bank and when that caves in, the ground is mixed and creates new vegetation. In the range of the African spurred tortoise, there are more and more desert date palms, supplying gum arabic. *Geochelone sulcata*, like termites and earth worms, participates in revitalisation of the soil.

2.7 Threats

Capturing of *Geochelone sulcata* for international trade has become more intense recently. They increased from 461 in 1990 and 3703 in 1995 to 5097 in 1996. Furthermore, the species has an suffered a marked decline in the past 50 years because of the advance of the desert, which has decreased the area of its distribution and because of destruction of its habitat owing to the sharp increase of the human population and herds of domestic animals. This is the case in Burkina Faso, Mali and Niger. Lambert (1993) wrote, "because of the continual capture of

tortoises, the populations in north central Mali have still not, in 1991, recovered after the long period of drought from 1969 to 1984".

When there is no capture for international trade, as in Mauritania, the remaining populations recover and juveniles are found in the wild (Arvy et al. 1997). Nonetheless, the distribution and the habitat of this species are reduced because of the advance of the desert.

3. Utilization and Trade

3.1 National utilization

Several ethnic groups in the Sahel, especially the nomadic tribes, eat the African spurred tortoise, which is a protein supplement in this region of the Sahel, among the poorest in the world (Warshall 1989). The African spurred tortoise, symbol of longevity and object of veneration, is a good-luck charm and, for this reason, is raised in captivity. This is a tradition among the Dogons in Mali (Griaule 1954; Perolini 1988). This tradition is reinforced by the more modern desire to have a pet turtle. This is the case in Senegal, where there are many African spurred tortoises in homes.

3.2 Legal international trade

For several decades, *Geochelone sulcata* has been traded internationally and this trade has greatly increased recently. Between 1987 and 1991, a total of 1754 African spurred tortoises were traded internationally according to reports from the Parties to CITES, of which 599 came from Sudan. Trade increased sharply from 471 in 1991 to 915 in 1992. International trade continued to increase, doubling and even tripling: 1195 *G. sulcata* sold in 1993, 2109 in 1994, 3703 in 1995 and 5097 in 1996. Exports dropped to 838 in 1997, but there were a large number of reexports that year.

The sudden jump in exports is due to the simultaneous sudden increase in imports to Japan: 212 in 1990, 2607 in 1995 and 3394 in 1996. In 1997, the United States of America reexported to Japan 3538 African spurred tortoises. It seems that the imported tortoises were used to make longevity potions (a recent use for this species).

NET IMPORTS OF LIVE *GEOCHELONE SULCATA* (SOURCE WCMC)

Country	1990	1991	1992	1993	1994	1995	1996	1997
AE	0	0	0	0	0	0	0	6
AT	0	0	4	4	8	0	0	0
AU	0	0	9	15	0	0	0	0
BE	0	0	47	19	0	82	140	0
BR	12	0	0	0	0	0	0	0
CH	0	9	0	0	0	0	0	0
CL	0	0	0	4	0	0	28	9
CR	0	4	0	0	0	0	0	0
CS	4	0	0	0	0	0	0	0
CZ	0	0	0	2	25	130	0	0
DD	4	0	0	0	0	0	0	0
DE	44	2	86	76	1	88	0	14
DK	0	0	0	0	0	10	0	4
EG	0	0	111	0	0	0	0	0
ES	0	0	46	22	57	96	77	129
FR	0	2	100	0	2	159	85	0

Country	1990	1991	1992	1993	1994	1995	1996	1997
GB	2	10	102	0	1	25	101	126
GH	0	0	0	0	0	211	0	0
HK	0	0	0	0	16	54	69	0
HU	0	0	0	0	0	10	0	0
ID	0	0	0	0	0	21	0	0
IT	0	0	8	0	6	26	20	0
JP	212	184	230	1 053	1 903	2 607	3 394	0
MA	0	4	0	0	0	0	0	0
MX	0	0	0	0	0	0	6	0
MT	0	0	0	0	2	0	0	4
NL	0	0	142	0	29	110	48	0
PT	0	0	0	0	0	0	6	2
SE	0	0	0	0	0	58	0	0
SG	0	0	0	0	0	4	6	4
SK	0	0	0	0	24	0	0	0
SN	0	0	0	0	0	2	0	0
SV	0	0	0	0	0	10	0	0
TW	0	0	0	0	10	0	0	0
US	183	333	32	0	0	0	1 117	540
XX	0	0	0	1	0	25	0	0
Total	461	548	918	1 195	2 109	3 703	5 097	838

NET EXPORTS OF LIVE *GEOCHELONE SULCATA* (SOURCE WCMC)

Country	1990	1991	1992	1993	1994	1995	1996	1997
AE	10	0	13	0	100	0	0	1
BF	0	3	0	0	0	0	0	0
BI	0	10	0	0	0	0	0	0
CH	82	0	94	81	65	137	27	18
CM	0	0	0	0	0	225	0	0
DE	0	0	0	0	0	0	2	1
EG	0	0	0	237	0	0	30	0
GB	0	0	0	0	0	0	0	60
GH	0	202	40	0	435	0	864	296
IL	0	15	0	0	0	0	0	0
KE	0	0	0	0	1	0	0	0
ML	24	0	0	0	0	1 973	315	193
NE	0	0	0	0	44	0	32	32
NL	2	0	0	19	0	0	0	25
NZ	0	0	0	0	0	4	0	0
OM	0	0	0	0	0	25	1	0

Country	1990	1991	1992	1993	1994	1995	1996	1997
SD	2	0	597	74	418	602	561	0
SN	0	4	23	20	0	0	0	0
TG	341	314	151	238	144	60	35	0
US	0	0	0	526	900	477	3 230	210
ZA	0	0	0	0	2	0	0	0
ZM	0	0	0	0	0	200	0	0
XX	0	0	0	0	0	0	0	2
Total		548						

3.3 Illegal trade

Togo was identified as the country of origin for 1343 *Geochelone sulcata* from 1987 to 1992, but this country has almost no more *G. sulcata* on its territory because there is almost no more dry savannah. These animals were probably captured in Mali and reexported from Togo (Anonymous 1996). The same comment is valid for Ghana, where this species is not found and for the Cameroon where there are almost no more specimens. In the reports of 1996-1998, the specimens exported from Ghana are listed as being of wild origin and from Mali without there being any declared import or export between the two countries.

3.4 Actual or potential trade impacts

A volume of trade is one of the main reasons for the decline of this species. According to the proverb: « the straw that broke the camels back". Trade has led to systematic capture, especially by herders. In the countries where there is capture for trade, there are no longer juvenile *G. sulcata* in the wild. This is dramatic for a species that takes about fifteen years to become an adult. The generations are not renewed. This biological characteristic creates a great vulnerability for the species. Furthermore, its fulfils biological criterion Av for listing in Appendix I.

Capturing is all the more harmful because it is accompanied by a reduction in the area of distribution caused by desertification and the destruction of the habitat by herds. Proof has been provided by recent studies by Arvy et al. (1997) in Mauritania, where there is no organized international trade, promoting systematic capture, juveniles can still be found in the areas where this species survives.

Mali is the country that has suffered the largest capture, because the specimens exported by Ghana, Niger, Togoand even countries like Hungry and the United States of America are declared to be of wild origin in Mali, a total of 1313 tortoises in 1996 and 570 in 1997. It is easy to understand that the population of this species dropped sharply in the country known as the natural reservoir for this species.

3.5 Captive breeding or artificial propagation for commercial purposes (outside country of origin)

Breeding of *Geochelone sulcata* in zoos has been reported many times (Kapoksy 1979; Dickinson 1985; Stearns 1989). Breeding in captivity of this species is easy, especially within its range or in areas with a hot and dry climate (Dickinson 1985). Captive breeding can meet demand. The United States of America reproduce sufficient *G. sulcata* for domestic demand, according to one of the best turtle specialists in that country (Pritchard, personal communication). The 2941 specimens exported from the United States of America to Japan in 1996 were declared to be from breeding operations. Breeding centres can be established in the countries of origin and receive the approuval of CITES, but breeding operations must be regulated and the turtles marked reliably and permanently. For suddenly the import demand in the European Union for *G. sulcata* "to be breed in captivity in a single country " when during the previous year there were only wild specimens exported from that same country raises many questions.

4. Conservation and Management

4.1 Legal status

4.1.1 National

Benin: According to decree n° 80-88 of 1984, tortoises such as *G. sulcata* are classified as small game.

Burkina Faso: According to 1985 hunting regulations, *G. sulcata* is partially protected. Its capture requires special authorisation.

Central African Republic: According to a 1984 law, *G. sulcata* is fully protected.

Ethiopia: In accordance with 1972 regulations on the protection of wildlife, all species of *Geochelone* are completely protected.

Mali: In implementation of the 1969 regulation on hunting, ordinance N° 60-C. M. L. N. partially protects these turtles.

Mauritania: The 1975 regulation on hunting and wildlife requires a hunting permit and prohibits the capture, possession and exportation of wild animals, except for holders of permits for commercial capture.

Niger: The 1964 decree N° 64-122/MFAE/MER/MI prohibits trade and export of wild animal products. Decree N° 72-88/MER/MI of 1985 prohibits all hunting.

Senegal: *G. sulcata* is on the list of completely protected species included in the 1967 regulations on the protection of wildlife, which also list regulations for possession in captivity of wild animals.

Togo: Ordinance N° 4 on hunting and the protection of wildlife lists the turtles in the list of partially protected species. The decree implementing Ordinance N° 80-171 establishes limits to this partial protection.

Source: Final report to the Cites Animals Committee. *Geochelone sulcata* (Miller, 1779). March 1996. IUCN/SSC, TRAFFIC, WCMC.

4.1.2 International

European Union. Regulation (CE) n° 1968/99 of the Commission dated 10 September 1999 suspending introduction into the Community of specimens of several species of wild fauna and flora listed *Geochelone sulcata* as one of the species concerned, for all wild, all specimens, and all countries of origin. This Regulation is justified in light of regulation (CE) n° 338/97 of the Council of 9 December 1996 concerning the protection of species of wild fauna and flora through the regulation of their trade, which lists in its article 4, paragraph 6, the restrictions mentioned above, whenever it appears that factors linked to the conservation of a species argue in favour of delivering an import permit (articles 4,1e and 2a).

4.2 Species management

4.2.1 Population monitoring

In Senegal, there is a monitoring programme established by an NGO, the Fondation Rurale pour le Développement, with the support of the ministry concerned. There are no other official monitoring programmes for this species. SOPTOM, an NGO financed a study on the status of this species and carried out several surveys in the ranges States.

4.2.2 Habitat conservation

The habitat has been irremediably degraded and even destroyed by the human population and the herds, both increasing greatly. The habitat is preserved in the national parks and, when there are *Geochelone sulcata,* they are doing well. This is the case of the populations of *G. sulcata* in the Parc du Diawling in Mauritania and of the Parc du W in Niger. However, they are no longer reported in the Réserve des six forages and the Reserve de Doli in Senegal and the reserve of Aïr and Ténéré in Niger, described in the 1996 report of the CITES Animals Committee (Anonymous, 1996; Devaux, in preparation).

4.2.3 Management measures

In light of the threats to the *Geochelone sulcata*, the IUCN/SSC Land Tortoise and Freshwater Turtle Specialist Group has promoted a conservation programme for this species. A programme was established in 1993 by the Fondation Rurale pour le Développement, a Senegalese association, whose director is Thomas Diagne and supported by SOPTOM, a European NGO. A breeding centre, an information and protection centre were created in Sangalkam, near Dakar, Senegal, and a restocking project were reared. *Geochelone sulcata* from in Rotterdam and Vlissingen in the Netherlands and from the Muséum National d'Histoire Naturelle and Touroparc in France have been repatriated to Senegal. The centre and its programme have been financed by the DG VIII of the European Commission. A genetic programme is planned to identify the origins of the tortoises at this centre. In 1998, Thomas Diagne was awarded the Prix Rolex for his work in protecting the *Geochelone sulcata* in Senegal.

4.3. Control measures

4.3.1 International trade

Enforcement against fraud and smuggling are insufficient, especially between Mali, Ghana and Togo.

Geochelone sulcata is sold as a "souvenir" bought by foreign tourists and is difficult to regulate.

5. Information on Similar Species

It is easy to identify the *Geochelone sulcata* and to distinguish it from the other tortoises. There is no problem confusing it with other species.

8. References

Anonyme, 1996 - Detailed reviews of 24 species. Final report to the Cites Animals Comittee. *Geochelone sulcata* (Miller, 1779). IUCNSSC, TRAFFIC, WCMC. 8 p.

Arvy, C., Marissal, N., Dia , A. et Colas, F., 1997 - Observations sur la répartition et les dimensions de *Geochelone sulcata* (Cryptodira, Testudinidae) en Mauritanie occidentale. Bull. Soc. Herp. Fr., 81: 11-20.

Broadley, D. G., 1989 - *Geochelone sulcata*. In: The Conservation Biology of Tortoises. Swingland, I. R. et Klemmens, N. W., éds, Occas. Papers IUCNSSC, 5: 47-48.

Chevalier, A., 1935 - Les Iles du Cap-Vert. Géographie, Biogéographie, Agriculture. Rev. Bot. Appl. Agr. Trop., 15 (170-171): 733-1090.

Cloudsey-Thompson, J. L., 1970 - On the biology of the desert Tortoise *Testudo sulcata* in Sudan. J. Zool. London, 160: 17-33.

Devaux, B., 1993 - S. O. S. *Sulcata*. SOPTOM, Gonfaron. 27 p.

Devaux, B. - *Geochelone sulcata* la "tortue qui pleure". SOPTOM, Gonfaron (sous presse).

Diagne, T., 1995 - Etude et conservation de *Geochelone sulcata* au Sénégal. International Congress of Chelonian Conservation Procceedings. Gonfaron. SOPTOM. 110-111.

Dickinson, P., 1985.- Maintenance, behavior and breeding of African spur thighed tortoise. Interrnat. Zoo News, 194, 32(6): 3-19.

Ernst, C. H. et Barbour, W. B., 1989 - Turtles of the world. Smiths. Inst. Press, Washington. 313 p.

Gasperetti, J., Stimson A., Miller, J., Ross J., Gasperetti, P., 1993 - Turtles of Arabia. Fauna of Saudi Arabia, 13. 170- 367.

Griaule, M. 1952 - Explorations outre-mer. Paris doc. française. 110-125.

Grubb, P., 1971 - Comparative notes on the behavior of the *Geochelone sulcata*. Herpetologica, 27: 328-333.

Highfield, A., 1998 - The African Spurred Tortoise, *Geochelone sulcata*. Reptiles USA: 18-27.

Hirth, H. F. et Abdel Latif, E. M., 1981 - Morphometrics of the spurred tortoise *Geochelone sulcata*, in the Sudan. J. Herpetol., 15: 120-121.

Iverson, J. B., 1986 - A revised checklist with distribution maps of Turtles of the world. Richmond, Indiana USA. 363 p.

Joger, U., 1990 - The herpeto fauna of the Central African Republic, with description of e new species of Rhinotyphlops (Serpentes: Typhlopidae). In Vertebrates in the tropies. G. Peters et R. Hunterer (eds.) Museum Alexander Koenig. Bonn, 1990: 85-102.

Lambert, M. R. K., 1993 - On growth, sexual dimorphism, and the general ecology of the African Spurred Tortoise, *Geochelone sulcata*, in Mali. Chelon. Cons. Biol., 1(1): 37-46.

Lambert, M. R. K., 1995 - On general biology and utilization of the African Spurred Tortoise, *Geochelone sulcata* in Mali, West Africa. International Congress of Chelonian Conservation Procceedings. Gonfaron. SOPTOM: 112-114.

Lopez-Jurado, L. F., Mateo, J. A. et Garcia-Marquez, M., 1998 - La tortuga fosil de la isla de Sal (Archipiélago de Cabo-Verde). Rev. Esp. Herp., 12: 111-114.

Loveridge, A. et Williams, E. E., 1957 - Revision of the African tortoises and turtles of the suborder Cryptodira. Bull. Mus. Comp. Zool., 115: 163-541.

Mahmoud, Z. N. et EL Naiem, D. A., 1988 - Studies on the growth of the desert tortoise (*Testudo sulcata*) in Sudan ; changes in morphometrics and body weight fron hatching to one year. Herp. Journ., 1: 280-284.

Meek, R. et Avery, R. A., 1988 - Allometry in *Testudo sulcata*: a reappraisal. Herpetol. Journ., 1: 246-247.

Moore, J. E., 1997 - Potential threats to tortoise populations in Parc National de W, Niger, West Africa. Proceedings Int. Conf. New York Turtle and Tortoise Society. 28-30.

Perolini, M., 1988 - *Geochelone sulcata* - chez les Dogons. La Tortue, 8: 9-10.

Stearns, D. C., 1989 - The captive status of the African spurred tortoise *Geochelone sulcata:* recent developpments. Int. Zoo. Yb., 28: 87-98.

Stubbs, D., 1989 - Tortoises and freshwater turtles. An action plan for their conservation. UICNSSC éd. 47 p.

UNESCO-FAO, 1963 - Bioclimatic map of the Mediterranean zone (prepared by L. Emberger, H. Gaussen, M. Kassas et A. de Philippis. UNESCO-FAO Arid Zone Research, 21: 1 p.

Villiers, A., 1958 - Tortues et Crocodiles de l'Afrique noire française. Coll. Initiations africaines XV. IFAN, Dakar. 354 p.

Warshall, P., 1989 - Mali: biological diversity assessment. Washington. U. S. Agency for international Development, Natural ressources Management support Project (n° 648-0467). 95 p. (cité par Lambert, 1993).