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Rangelands biodiversity in presaharian Tunisia

A. Ferchichi

Institut des Régions Arides 4119, Médenine, Tunisia

Summary - Rangeland in presaharian Tunisia shelter a rich flora which include about 836 species. 100 of them are specific to presaharian Tunisia and 21 species are endemic. Since some decades, because of the rapid tendency to the total sedentariness of the population, the breaking of the great collective lands and the disappearance of transhumances, presaharian Tunisia rangelands are increasingly submitted to an irrational and anarchic exploitation that induce a qualitative and a quantitative degradation. 43 species are considered as threatened of extinction and many habitats (oueds, steppes etc.) are exposed to destruction.

Key-words: presaharian Tunisia, biodiversity, rangelands

Résumé - Les parcours de la Tunisie présaharienne renferment une flore riche totalisant environ 836 espèces. 100 d'entr'elles sont spécifiques à la Tunisie présaharienne et 21 espèces sont endémiques. Depuis plusieurs décennies, et suite à la tendance rapide à la sédentarisation de la population, au morcellement des grands collectifs et à la disparition de la transhumance, les parcours de la Tunisie présaharienne sont incessamment soumis à une exploitation irrationnelle et anarchique ayant engendré leur dégradation qualitative et quantitative. 43 espèces sont considérées menacées d'extinction et plusieurs habitats (oueds, steppes etc.) sont exposés à la destruction.

Mots clés: Tunisie présaharienne, biodiversité, parcours

Introduction

Biodiversity, or biological diversity, seems to be one of the most controversial words in environmental discussion.

A definition of biodiversity that is altogether simple, comprehensive, and fully operational is unlikely to be found. All authors agree that biodiversity is the totality of genes, species, and ecosystems in a region (WRI, 1992). Natural diversity has a variety of meanings. These include : the number of different native species and individuals in a habitat or geographical area, the variety of different habitats within an area, the variety of interactions that occur between different species in a habitat, and the range of genetic variation among individuals within a species (Jones and Stokes, 1987).

Since some decades, because of the rapid tendency to the total sedentariness of the population, the breaking of the great collective lands and the disappearance of transhumances, presaharian Tunisia rangelands are increasingly submitted to an irrational and anarchic exploitation (Ferchichi and Neffati, 1992; Ferchichi *et al.*, 1991) that induce a qualitative and quantitative degradation.

The reasons for degradation and biodiversity loss are changing. In prehistoric times, climatic changes and competition with other species were the main causes. In historic times, over exploitation and exotic species introductions have caused many extinctions. But today, the main problems facing wildlife are habitats destruction.

In order to monitor biological diversity, we have to consider, in this paper, diversity between species and biological communities or ecosystems.

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Specific biodiversity

The Mediterranean element is largely predominant in the flora of presaharian Tunisia rangeland. It represents some 76%. The element saharo-arabic constitutes only 17%. The rest is constituted by pluri-regionals elements.

Among 2103 that compose the vascular flora of Tunisia (Cuénod *et al.*, 1954; Pottier-Alapetite 1979, 1981), 100 species are from presaharian Tunisia (Nabli, 1989). They distribute, follow their area of distribution, in : endemic Tunisians = 4, -north-africans = 20, iberomaoritaneans = 4, saharians = 21, saharo mauritaniens = 6, saharo-arabics = 27, -pluri-regionals = 18.

The predominant families are Compositae, Leguminosae and Poaceae. These represent approximately 30% of presaharian Tunisian flora.

23 species are endemic in presaharian Tunisia (see Table 1).

Table1: Endemic species in presaharian Tunisia rangelands

N°	Species	N°	Species	N°	Species
1	<i>Anarrhinum brevifolium</i>	10	<i>Aristida tunetana</i>	19	<i>Atriplex mollis</i>
2	<i>Astragalus leptophilus</i>	11	<i>Atractylis candida</i>	20	<i>Chrysanthemum deserticolum</i>
3	<i>Calligonum arich</i>	12	<i>Centaurea omphalotricha</i>	21	<i>Echium djeneiense</i>
4	<i>Daucus syrticus</i>	13	<i>Dianthus byzacenus</i>	22	<i>Helianthemum tunetanum</i>
5	<i>Ferula tunetana</i>	14	<i>Galium olivetorum</i>	23	<i>Maresia doumetiana</i>
6	<i>Iris juncea</i>	15	<i>Launaea quercifolia</i>	24	<i>Scilla villosa</i>
7	<i>Scabiosa roberti</i>	16	<i>Scabiosa thysdrusiana</i>	25	<i>Teucrium alopecurus</i>
8	<i>Sisymbrium polyceratium</i>	17	<i>Sporobolus tourneuxii</i>		
9	<i>Teucrium gabesianum</i>	18	<i>Astragalus kralickianus</i>		

Ecosystems biodiversity

These pastures are essentially steppes, although it remains some thousand hectares of maquis on Jbels and a forest-park of *Acacia raddiana* covering 30.000 ha at Bled Talh.

The maquis concerns for the essential a maquis and groupements of forest degradation of *Juniperus phoenicia* or *Pinus halepensis* of Jbels (mountains). The vegetation is based on *Juniperus phoenicea*, *Genista microcephala*, *Stipa tenacissima*, *Artemisia herba-alba*, *Rosmarinus officinalis*, *Thymus hirtus*, *Periploca angustifolia*, etc.

The steppes are formed by chamaephytics and annual species. We can distinguish, according to, the floristic composition and the pastoral value, the following kinds of steppes :

- Steppes of *Rhanterium suaveolens* developing on deep sandy alluvial soil and deep coarse sands. This vegetable formation is characterized by a pastoral flora enough diversified (*Rhanterium suaveolens*, *Stipa lagascae*, *Lotus creticus*, *Argyrolobium uniflorum*).

- Steppes of *Artemisia herba-alba* occupying glaxis and low glaxis of mountainous relief. The pastoral flora is little diversified (*Artemisia herba-alba*, *Aristida obtusa*, *Stipa parviflora* etc)..

- Steppes of *Lygeum spartum* characterizing rich sulphates media. The main pastoral species are *Anarrhinum brevifolium*, *Erodium glaucophyllum*, *Aristida ciliata* etc.

- Steppes of *Stipagrostis pungens* linked to the steppes degradation of *Rhanterium suaveolens* where the sand put in movement will be colonized and then fixed by *Stipagrostis pungens* and other sandy species.

- Steppes of *Hammada schmittian* occupying continental sandy plains of the arid and saharian climate. The essential of the pastoral flora is constituted by the annuals species.

- Steppes of *Anthyllis sericea* subsp. *henoniana* constituted by vegetative groupings that developed on xerics soils where *Anthyllis henoniana*, *Gymnocarpos decander* and some annual species are the essential of the pastoral flora.

- Steppes of crassulescents dominated by halophytic species occupying salted lands. Following a gradient of decreasing saltiness, the vegetation is composed of *Halocnemum strobilaceum*, *Arthrocnemum indicum*, *Suaeda mollis*, *Salsola tetragona*, *Limoniastrum guyonianum*, *Atriplex halimus*, *Nitraria retusa*, *Salsola vermiculata* etc.

The forest of *Acacia raddiana* is a clear forest, confined in the region of Bled Talh. *Acacia raddiana* is found in various vegetative grouping (Le Houérou, 1969, 1995). In Jbel (mountain) Bou-Hedma, we found some individuals in a typical vegetative association of *Juniperus Phoenicea*. In the plain, *Acacia raddiana* constitute a forest-steppe where a diversified vegetation is growing on *Aristida ciliata*, *Aristida plumosa*, *Aristida adscensionis*, *Hyparrhenia hirta*, *Cenchrus ciliaris*, *Digitaria commutata*, *Tricholaena teneriffae* etc.

Because of the intensity of over-grazing many species and populations of species became threatned of extinction. We enumerate an exhaustive list of these species in table 2.

Table 2. Endangered species in presaharian Tunisia rangelands.

N°	Species	N°	Species	N°	Species
1	<i>Anabasis oropediolum</i>	16	<i>Echiochilon fruticosum</i>	31	<i>Cornulaca monochantha</i>
2	<i>Argyrolobium uniflorum</i>	17	<i>Eragrostis papposa</i>	32	<i>Dichanthium annultum</i>
3	<i>Aristida coerulescens</i>	18	<i>E. trichophora</i>	33	<i>Gymnocarpos decander</i>
4	<i>Aristida tunetana</i>	19	<i>Helianthemum hirtum</i> <i>ruficomum</i>	34	<i>H. kahiricum</i>
5	<i>Artemisia herba alba</i>	20	<i>H. lippii ellipticum</i>	35	<i>H. sessiliflorum</i>
6	<i>Botriocloa ischaemum</i>	21	<i>Heteropogon contortus</i>	36	<i>Hordum bulbosum</i>
7	<i>Hyparrhenia hirta</i>	22	<i>Launaea resedifolia</i>	37	<i>Lotus creticus s.l.</i>
8	<i>Matthiola fruticulosa</i>	23	<i>Melica cilita</i>	38	<i>M. cupani</i>
9	<i>Moricandia nitens</i>	24	<i>Plantago albicans</i>	39	<i>Polygonum equisetiforme</i>
10	<i>Puccinellia distans</i>	25	<i>Rhanterium suaveolens</i>	40	<i>Salsola sieberi zygophylla</i>
11	<i>Scorzonera laciniata</i>	26	<i>S. undulata</i>	41	<i>Stipa barbata</i>
12	<i>S. lagascae</i>	27	<i>S. parviflora</i>	42	<i>Stipagrostis acutiflora</i>
13	<i>S. ciliata</i>	28	<i>S. foexiana</i>	43	<i>S. obtusa</i>
14	<i>S. plumosa</i>	29	<i>S. pungens</i>		
15	<i>Traganum nudatum</i>	30	<i>Tetrapogon villosus</i>		

Problematic of biodiversity conservation

You are God if you are "preserving biodiversity". However, you can become Darth Vader if you are "destroying biodiversity", especially if you make a profit at it (Burger, 1998).

Of course, there will never be any type of absolute preservation of destruction, but everyone can help just by understanding the problem. It is true that once a species is extinct, it is gone forever. But it is also true that once a species is extinct it provides a chance for new ones to take its place. Put simply, every time a creature dies there is always a loss, but everytime a new one is born there is a gain.

Ecologists have identified many specific relationships that allow them to asses how environmental changes will affect species diversity and how changes in species diversity will

affect certain ecological processes. A number of recent advances in ecology that detail such relationships provide decision-markers.

With knowledge of the particular roles of species within communities and the important influences of disturbance and environmental heterogeneity on species richness growing, it is increasingly possible to use and manage land in ways that maintain the species within a region and provide valuable ecosystem services to humanity.

Characteristic diversity can be decreased by, for instance, adding exotic species or allowing moderate disturbance. It can be decreased through such changes as species loss or the prevention of natural patterns of disturbance and invasion. An ecosystem's characteristic diversity can be altered to modify the services that ecosystem provides to humanity.

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