Diachronic Analysis of Vegetation in the Sylvopastoral Zone (Senegal): What Lesson to Learn from?

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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Diachronic analysis of vegetation in the Sylvopastoral zone (Senegal) : what lesson to learn from ?

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Keys words : diachronic , sylvopastoral , drought , ecological monitoring , vegetation density

Introduction The Sylvopastoral zone (ZSP) of Senegal has been occupied for several centuries by pastoralists . During this period , frequent bush fires traversed the zone . During the 1950's the installation of boreholes allowed a permanent settlement of an increasing livestock population . Since 1970 , the modifications due to these factors were reinforced with rainfall deficits in particular . To better understand this phenomenon , monitoring was initiated , but discontinued . However , the changes related to these factors continued . The objective of this study was to identify the recent dynamics of the vegetation .

Methods of study An inventory of the woody species (sp) was made in the north at FétéOlé (FO) and in the centre at Dahra (Dh) . FO was studied between 1971 to 1976 (Poupon , 1980) and Dh between 1990 to 1998 . The same experimental designs were used again in 2003 . The study of herbaceous species was done through the exploitation of the data from the Ecological Monitoring Centre (CSE) at three sites according to a north-south axis [Souillène (So) ,Kalossi (Ka) and Ndioumanane (Nd)] from 1988 to 2003 .

Results and discussion Data on woody species at FO (between 1972 and 2003) and at Dh (1996 and 2001) do not indicate variation in the number of species (sp .) but woody density was reduced by 44% and 58% respectively . The number of individuals species has increased in the case of *Boscia senegalensis* and *Calotropis procera* at FO ; but decreased for *Balanites aegyptiaca* , *Commiphora africana* , *Guiera senegalensis* and *Acacia senegal* at FO and *Calotropis procera* and *A . senegal* in Dh . The study of the structure of the settlements shows that some sp have a high number of young individuals at FO and Dh , *Boscia senegalensis* and only at FO , *C .procera* , *B . aegyptiaca* and *G . senegalensis* .

These results show that the environmental conditions in the ZSP are favourable to *B . senegalensis* and less favourable in some sites to *B aegyptiaca* . *C . procera* is maintained with rather old plants in Dh and continues its regeneration in the North . Sp . like *G . bicolor* and *A . senegal* are suffering everywhere . Others sp found only in FO like *C . africana* and only in Dh like *Acacia seyal* and *Acacia nilotica* show the same difficulties of growth . In comparison with studies conducted by Poupon (1982) , the progression of woody sp drought resistance continues , especially in north .

The data for herbaceous sp from 1988 to 2003 indicated that both the north and the center (with low rainfall) have values that are higher than those from the south . This was not expected . Some sp can also be regarded as characteristic of these sites since they were regularly collected : *Aristida mutabilis* and *Chloris prieurii* in So ; *Cenchrus biflorus* and *Alysicarpus ovalifolius* in Ka ; *Schoenefeldia gracilis* , *Zornia glochidiata* in Nd . The relationship between the number of sp/year and the amount of rainfall is not significant as well is the diachronic analysis of herbaceous data . Six year-groups could be highlighted but the discrimination factors were not identified ; the presence of annual sp . depended on several variable factors in the Sahel such as the characteristics of the sp and the environment (Diouf and Lambin , 2001) .

Conclusions The study of the vegetation in ZSP from 1988 to 2003 showed that biodiversity was maintained . A very clear reduction in of the density of some woody sp . , however , was noted , but was compensated by an increase in sp adapted to drought . The number of herbaceous sp did not seem to vary according to rainfall or years and it is very often higher in north or the centre than in the more rainy southern zone .

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