

ASSESSMENT OF THE FLORA OF BURKINA FASO

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Abstract

Sixteen years after the last comprehensive checklist of Burkina Faso, about 30% more species have become known for the country's flora. Many of these are documented in the herbarium collections of the University of Ouagadougou (OUA) and the Herbarium Senckenbergianum (FR). Nevertheless some regions and habitat types are still incompletely sampled. To address these gaps, geographical patterns of collection intensity and species richness are analysed and focus areas for future research identified. The presently known species composition is analysed according to taxonomic and functional groups.

Résumé

Évaluation de la flore Burkinabé. Seize ans après la publication du dernier catalogue détaillé des plantes vasculaires du Burkina Faso, environ 30% d'espèces ont été recensées de plus pour la flore. La plupart de ces espèces sont décrites dans les collections d'herbiers de l'Université de Ouagadougou (OUA) et de l'Herbier de l'Institut Senckenberg de Francfort (FR). Toutefois il subsistent des régions et des habitats qui restent encore sous-échantillonnés. Pour combler cette lacune, la distribution géographique des collections et la richesse spécifique ont été analysées et des régions ciblées pour des futures investigations ont été identifiées. La composition spécifique actuellement connue est analysée selon les groupes taxonomiques et fonctionnels.

Key words: Burkina Faso, flora, herbarium collections, plant diversity.

1 Introduction

A first comprehensive assessment of the flora of Burkina Faso has been achieved by Guinko (1984) with his *Vegetation de la Haute-Volta*. This was followed by the *Catalogue des plantes vasculaires du Burkina Faso* by Lebrun *et al.* (1991). Sixteen years after this last compilation, we are working on a checklist integrating the findings of the intense research recently carried out within the country and actively closing gaps in collection intensity.

Burkina Faso is part of the Sudano-sahelian savanna belt with a steep gradient in precipitation ranging from c. 300 mm in the North to c. 1200 mm in the Southwest. With higher rainfall, general density and height of vegetation as well as species richness increase towards the South (e.g. Schmidt *et al.*, 2005).

2 Methods

2.1 Data bases

The digitisation of the West Africa collection of the Herbarium Senckenbergianum (FR) and the Ouagadougou University Herbarium (OUA) as well as the compilation of more than 4,500 relevés in a vegetation database made it not only easier to add species to our compilation of the flora of Burkina Faso, but also enabled us to analyse the state of research, and direct further collection activities to undersampled areas and habitats. Further collection data (c. 2000 records) were downloaded from the Herbarium Jutlandicum website (http://herb42.bio.au.dk/aa_u_herb/default.php).

The comprehensive data enabled us to address other, often-neglected aspects, e.g. temporal collection patterns (Fig. 1), or the coverage of ecological gradients, that might also be responsible for sampling bias.

The lowlands near the Volta rivers, the Comoé and the Pendjari, but especially the higher regions in SW Burkina Faso need more attention (Table 1).

A great help in harmonising synonymies in our primary data was the *African Flowering Plants Database* (<http://www.ville-ge.ch/cjb/bd/africa/index.php>, see e.g. Klopper *et al.*, 2006) that is based on Lebrun & Stork (1991–1997) for tropical Africa.

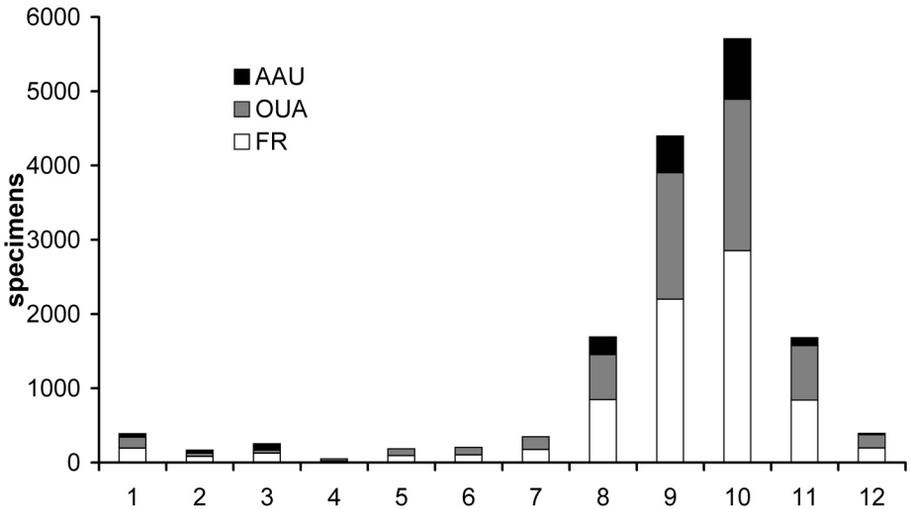


FIG. 1. Number of specimens collected per month. Data from the Herbarium Senckenbergianum (FR), Ouagadougou University Herbarium (OUA) and Herbarium Jutlandicum (AAU). There is a peak in collecting activities towards the end of the rainy season, when most species are easily identifiable. Only very few specimens are from the dry season and early rainy season. Thus, early flowering plants like many geophytes might have been undersampled.

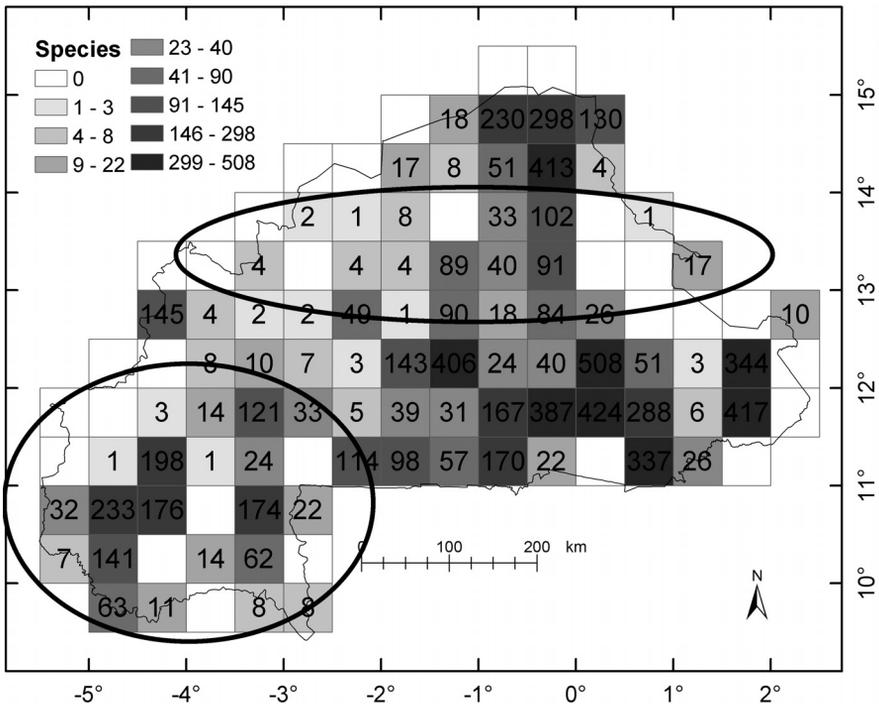
TABLE 1. Altitudinal distribution of species occurrences (specimens and observations). Most documented species are found at 200–400 m above sea level.

Altitude	No. of specimens and observations
100 – 200 m	1643
200 – 300 m	26154
300 – 400 m	13704
400 – 500 m	199
500 – 600 m	25

2.2 GIS analysis

Most of the specimens in our databases had GPS coordinates and many others were subsequently georeferenced with the help of an online gazetteer, the *Geonet Names Server* (<http://gnswww.nga.mil/geonames/GNS/index.jsp>), or topographic maps.

Simple operations like mapping the locations and counting specimens or species per area clearly showed centres of research activity and areas requiring further research (Schmidt *et al.*, 2005). One such undersampled area is the Sub Sahel, another one — and, considering its habitat diversity, the most important one — is the south-western part of the country (Fig. 2).



2.3 Collecting expeditions

The above mentioned analyses of sampling intensity directed our focus on the Southwest and so far we have conducted two collecting expeditions in the years 2004 and 2006, which resulted in the discovery of 65 species previously undocumented for Burkina Faso in 2004, and 48 species in 2006. Our expeditions led us to classified forests such as the Forêt Classée du Kou and the Forêt Classée des Sources du Mouhoun, to the Biosphere Reserve of the Mare aux Hippopotames, as well as to touristically well-known, but scientifically neglected sites such as the Cascades de Karfiguela and the Pics de Sindou, Burkina Faso's highest mountain, the Tenakourou and many other places in the region (Fig. 3).

A special focus was directed at the coverage of previously undersampled habitat types, e.g. gallery forests. Potential points of interest were identified with the help of geographic data, such as topographic maps, climate and elevation data and satellite images.

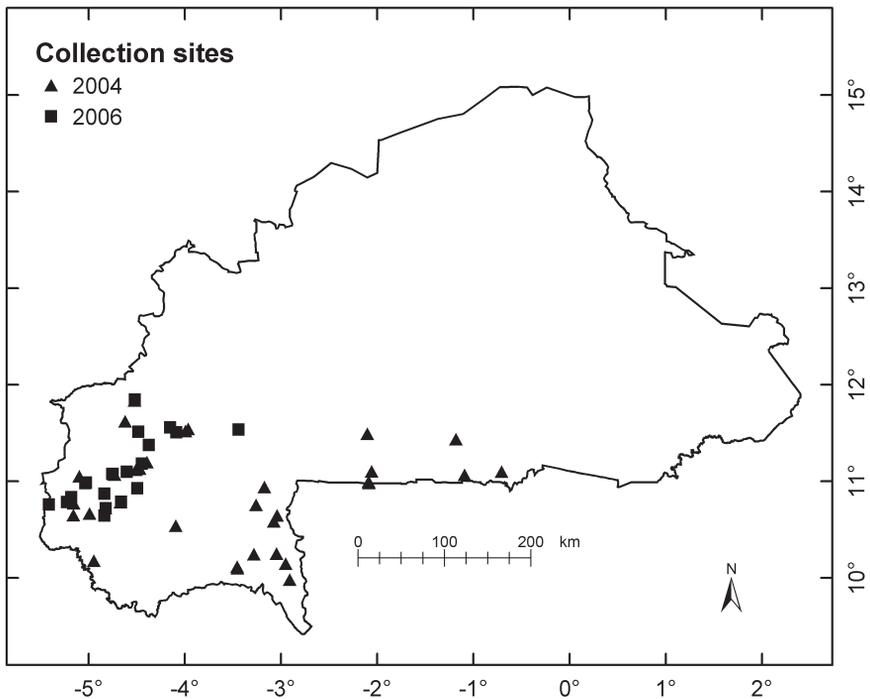


FIG. 3. Collection sites of the two expeditions by the OUA and FR teams conducted to diminish the knowledge gap in SW Burkina Faso.

3 Preliminary results

Angiosperms are by far the largest group of vascular plants in Burkina Faso (Table 2). Within these, there are more dicotyledons than monocotyledons. Although the southern neighbouring countries harbour the cycad *Encephalartos barteri*, for Burkina Faso there are no gymnosperms known. Within the pteridophytes, there is a high proportion of aquatic species within the genera *Azolla*, *Marsilea* and *Isoetes*.

TABLE 2. Number of species, genera and families within larger taxonomic groups.

	Families	Genera	Species
Dicotyledoneae	104	500	1125
Monocotyledoneae	32	159	488
Pteridopsida	7	7	13
Lycopodiopsida	2	2	3
Total	145	668	1629

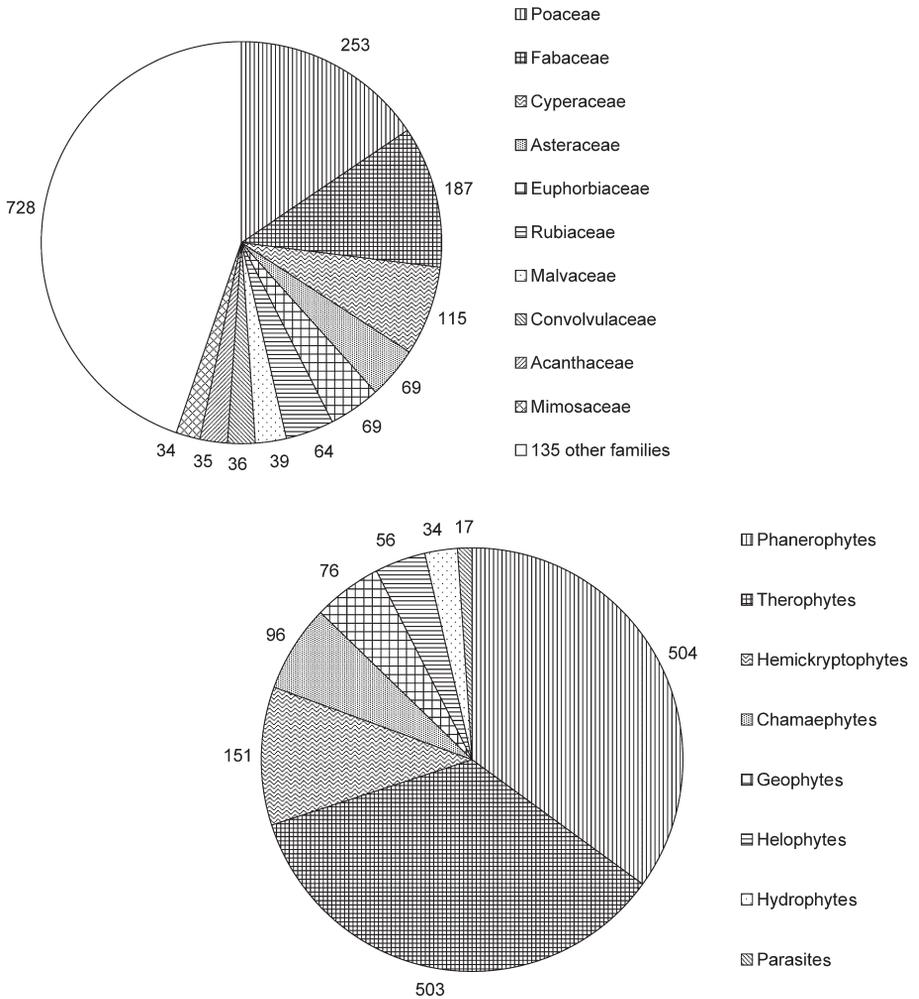


FIG. 4. The Burkinabé flora analysed according to families and life forms. Top: family spectrum; bottom: life form spectrum.

The three largest families are characterised by distinctive features of their metabolism: most of the Poaceae and many Cyperaceae are using C4 photosynthesis, the Fabaceae (s. str.) profit from symbiotic nitrogen fixation in their root nodules.

The life form spectrum (Fig. 4) is dominated by therophytes and phanerophytes, comprising each about a third of the flora's species. The remaining third is divided amongst hemicryptophytes, chamaephytes, geophytes, helophytes, hydrophytes and parasites.

4 Discussion

Although the number of vascular plant species known for Burkina Faso has increased by as much as 30% over the last decades, this work is not at all finished and we expect a further rise of species documentations as research is focussed on filling gaps in the existing data. The estimate of 2,000 species for Burkina Faso given by Madsen *et al.* (2004) might be reached or even exceeded in the next few years.

Acknowledgements

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