Electronic Plant Species Database of the Saadani National Park, coastal Tanzania

Instructions for the 1st edition (August 2007)

1. Introduction

The aim of the plant species database of the Saadani National Park (SNP) is to summarise all currently available data on seed plants (Speridophyta) that occur within the boundaries or close vicinity of the National Park. The database may serve as reference for new researchers to the area. It may also serve as a tool for further surveys and research, since it also contains lists of species that have not yet been found or identified, but which according to literature are potentially occurring within the SNP; many of these species are likely to turn up during further surveying. Botanical surveys in the area have been conducted at least since the 1970's, but due to formerly very limited literature some of the previous species data have been inadequate or have become taxonomically outdated. Still we are a considerable way from reaching a complete list of the species of SNP, taxonomic revisions are ongoing, and it is quite probable that new species will even be described from specimens collected within SNP, especially in endemic patches of coastal forest.

The MS Access database "Saadani NP Plant Database" is downloadable from the website http://www.wildlife-baldus.com/saadani.html.

An electronic database of photographic plant images (images in .jpg-format) is furthermore available on CD Rom upon request by e-mail from the main author: roland.cochard@env.ethz.ch

The first edition of the database has been composed by Dr. Roland Cochard. Much of the species information is, however, taken from publications and personal communication with Dr. Urs Bloesch, Prof. em. Dr. Frank Klötzli, Dr. Antonín Kozák and other authors (see Table 1). The database will be updated in collaboration by Dr. Roland Cochard and Dr. Urs Bloesch. Any comments and new species identifications may be communicated to them, optimally including any detailed description of the specimens, collection site (incl. GPS coordinates and habitat description) and date, and electronic images (if possible with images of reproductive plant parts and key characteristics) and/or collected materials of the plants:

Roland Cochard
Rietholzstrasse 14
CH – 8125 Zollikerberg
Switzerland
roland.cochard@env.ethz.ch

Urs Bloesch
Mittelstr. 26
2502 Biel
Switzerland
bloesch@swissonline.ch

If the record has been verified and entered, the collector will be acknowledged in the database (column ID), and in an updated version of these instruction pages.

If any information specifically based on the database is being used in a scientific publication, due reference shall be made to the source by citing the database as:

Cochard R. & Bloesch U. (eds) (2007). Electronic plant species database of the Saadani National Park, coastal Tanzania. Swiss Federal Institute of Technology ETHZ, German Agency for Technical Cooperation GTZ and Tanzanian National Parks Authority TANAPA.
[downloadable at http://www.wildlife-baldus.com/saadani.html]

2. Description of the Database

The MS Access file “Saadani NP Plant Database” contains four separate databases as follows:

1.) SNP plant species database
2.) checklist of plant families at SNP
3.) FtEA spp checklist (main plant families)
4.) checklist of potentially occurring Cyperaceae spp

2.1. SNP plant species database

“SNP plant species database” is the actual database containing the information about the species that have been found to be occurring within SNP, as well as listing some potentially occurring species that have not yet been found. Several species are still in doubt, or may represent several very similar species. By also listing potentially occurring species, the database may give indications on which species should be (re-) checked for identification with particular scrutiny, if ever possible using reproductive plant parts whenever available.

For each plant species the data base contains the following information listed in columns of the database:

Column “Species”:
Lists the scientific species name of a plant.

Column “Author”:
Lists the (abbreviated) name of the taxonomic author(s) of any species.

Column “Vrc”:
Based on column “CorrectionRC” this column lists whether a species record for SNP should currently be considered as valid (1) or invalid (0) (as suggested by RC, August 2007).

Column “ID”:
Lists the name initials of a person that presumably first suggested that the species would occur within the SNP. The initials refer to Dr. Urs Bloesch (UB), Prof. em. Dr. Frank Klötzli (FK), Dr. Antonín Kozák (AK) and Dr. Roland Cochard (RC). Many species names have been found in publications by these and other authors; the literature references and corresponding initials are summarised in Table 1. Potentially occurring species are listed as “pot”. Note that not all potentially occurring species have been listed in the database. For selected families (mainly of tree species) all “pot” species have been entered into the database, other families have not (yet) been treated in detail (for detailed information refer to the database “checklist of plant families at SNP”). For “pot” species in the large plant families of the grasses (Poaceae), legumes (Caesalpiniaceae, Mimosaceae, Papilionaceae), Rubiaceae and Annonaceae one should refer to the database “FtEA spp checklist (main plant families)”; for the sedges refer to the database “checklist of potentially occurring Cyperaceae spp”.

Column “Subsp”:
Lists any subspecies names of a particular species which are potentially occurring within SNP.

Column “Variety”:
Lists any varieties names of a particular species which are potentially occurring within SNP. This may also refer to just a particular subspecies listed; for detailed information refer to the taxonomic literature.

Column “Synonyms”:
Lists any synonymous names of a particular species. Note that the synonyms listed are mostly those found in the ecological literature of the area. This column does not provide an exhaustive list of all synonyms that may exist for a species. If a particular species name listed in a publication concerning SNP cannot be found in the species list, the synonym list should be checked. Many common species (especially the sedges, but also some woody plants) are listed but a different, newer name.

Table 1.
List of species source literature references and the corresponding (main) author initials.

initials	**species source literature references**
UB	Bloesch U. & Klötzli F. (2002). *The vegetation of the Saadani National Park and possible conservation and management strategies.* Tanzania Wildlife Discussion Paper No. 33 (ed. R.D. Baldus). Wildlife Division / GTZ, Dar es Salaam, Tanzania.
UB	Bloesch U. & Klötzli F. (2004). *Coastal forest of the Saadani National Park: conservation values and management strategies.* Tanzania Wildlife Discussion Paper No. 37 (ed. R.D. Baldus). Wildlife Division / GTZ, Dar es Salaam, Tanzania.
UB	Bloesch U. & Klötzli F. (2005). Zur Waldfähigkeit der Saadani-Küstensavannen in Tansania. *Berichte der Reinhard-Tüxen-Gesellschaft* **17**: 55-69.
RC	Cochard R. (2004). *Patterns and dynamics of secondary Acacia zanzibarica woodlands at Mkwaja Ranch, Tanzania.* PhD Thesis No 15830, Swiss Federal Institute of Technology, Zurich.
JF	Frazier J. G. (1994). Dry coastal ecosystems of Kenya and Tanzania. In: Dry Coastal Ecosystems: Africa, America, Asia and Oceania. (Ecosystems of the World 2B). (ed. van der Maarel, E.). pp. 129-150. 93. Amsterdam, Elsevier Press.
FK	Klötzli F. (1978). *Key for the identification of grasses in the sterile state.* Mkwaja Ranch, Tanzania, and Geobotanical Institute, Swiss Federal Institute of Technology, Zurich, Switzerland.
FK	Klötzli F. (1980). Range management in the Tanzanian coastal savannah. Preliminary report. *Acta IV Symposium Internacional de Ecología Tropical 07-11.03.1977, Panama.* pp. 855-874.
FK	Klötzli F. (1980). Analysis of species oscillations in tropical grasslands in Tanzania due to management and weather conditions. *Phytocoenologia* **8**: 13-33.
FK	Klötzli F., Lupi C. & Zisset S. (1995). Veränderungen in Küstensavannen Tanzanias: ein Vergleich der Zustände 1975, 1979 und 1992. *Verhandlungen der Gesellschaft für Ökologie* **24**: 55-65.
FK	Klötzli F. (2000). Savannen – in globaler Betrachtung. *Berichte der Reinhard-Tüxen-Gesellschaft* **12**: 31-63.
AK	Kozák A. (1983). *Der Nährwert einer tropischen Naturweide in Tansania.* PhD Thesis No 7270, Swiss Federal Institute of Technology, Zurich.
RC	Tobler M.W., Cochard R. & Edwards P.J. (2003). The impact of cattle ranching on large-scale vegetation patterns in a coastal savanna in Tanzania. *Journal of Applied Ecology* **40**: 430-444.

Column “Growth Form”:

Roughly describes the growth form of a plant as, ‘herb’, ‘grass’, ‘sedge’, ‘liana’, ‘climber’, ‘shrub’, ‘tree’, etc.

Column “Family”:

Lists the plant family name of a particular species. Note that the new family names are used, i.e. Compistae are listed as Asteraceae, Leguminosae/Fabaceae as Caesalpiniaceae, Mimosaceae and Papilionaceae, Gramineae as Poaceae, Labiatae as Lamiaceae, Guttiferae as Clusiaceae, Umbelliferae as Apiaceae, Cruciferae as Brassicaceae, and Palmae as Arecaceae.

Column “Division”:

Lists the angiosperm Division as either ‘monocot’ (Monocotyledoneae) or ‘dicot’ (Dicotyledoneae). Gymnosperms are listed as ‘(gymnosperm)’.

Column “Habitat”:

Provides a description of the habitat in which the species typically occurs. This description is mostly taken from the Flora of Tropical East Africa (Turrill & Beentje 1952-2007), from Beentje (1994) for trees, shrubs amd lianas, from Ibrahim (1989) for legumes, and from Haines & Lye (1983) for sedges (see Table 2).

Column “Notes”:

Lists any notes regarding the species, e.g. whether the species is an introduced exotic.

Column “CorrectionRC”:

Lists comments by Dr. Roland Cochard (as per August 2007) about how he would rate the validity of a particular species listed. It may be noted that these comments mainly took guidance by species distributions described in the literature. Some of the species listed as “ok” may still have been wrongly identified. On the other hand a species may indeed have been correctly identified, but was distrusted by RC because it would according to literature not occur in the northern coastal areas (i.e. in FtEA distribution units T3 and/or T6, below about 300 m elevation). Several species were not found in the literature or on the internet (specifically on the Tropicos database http://mobot.mobot.org/W3T/Search/vast.html of the Missouri Botanical Gardens). These species therefore most probably don’t exist and may be the product of citation errors. Yet, for reference purposes they are currently still listed in the database.

Column “check”:

Contains checks (‘X’) to mark species which may have to be checked with further scrutiny (e.g. electronic images, plant material).

Column “FtEA volume”:

Lists the plant family volume (including the year of its publication) of the Flora of Tropical East Africa (Turrill & Beentje 1952-2007) where a species is described. The species nomenclature generally follows FtEA, but may in some cases divert if the FtEA volume is old, and the species is listed by another name in a more recent reference (e.g. Beentje 1994).

Column “FtEA page/fig”:

Lists the page number and the number of the figure (if the plant has been illustrated) of a species in the respective plant volume of FtEA.

Column “Reference”:

Lists the codes of literature references (as per Table 2) other than FtEA where a description of the species can be found. The main references used where Beentje (1994; Be) for trees, Coe, Beentje & Wise (1991; CB) for acacias, Ibrahim & Kabuye (1988; IK) for grasses, Ibrahim (1989; Ib) for legumes, and Haines & Lye (1983; HL) for sedges. These references have been checked for all the species; if one of the references is not listed in the column it does not contain a description of the species. Other references have not been checked for all the species and are listed if they provide additional information.

Column “Picture”:

Lists the codes of literature references (as per Table 2) other than FtEA where an illustration of the species can be found. Other comments as for column “Reference”.

Table 2.
List of species identification literature references and the corresponding abbreviation codes as taken from authors’ initials.

code	**species identification literature references**
AA	Agnew A.D.Q. & Agnew S. (1994). *Upland Kenya wild flowers. A flora of the ferns and herbaceous flowering plants of upland Kenya.* East Africa Natural History Society, Nairobi.
Be	Beentje H. (1994). *Kenya trees, shrubs and lianas.* National Museums of Kenya, Nairobi.
Bl	Blundell M. (1987). *Collins Guide to the wild flowers of East Africa.* Collins, London.
CB	Coe M., Beentje H. & Wise R. (1991). *A field guide to the Acacias of Kenya.* Oxford University Press, Oxford.
DG	Dale I.R. & Greenway P.J. (1961). *Kenya trees and shrubs.* Buchanan, Nairobi.
Dh	Dharani N. (2002). *Field Guide to common shrubs of East Africa.* Struik Publishers, Cape Town.

ED	Eggeling W.J. & Dale I.R. (1951). *The indigenous trees of the Uganda Protectorate.* The University Press, Glasgow.
FG	Fabian A. & Germishuizen G. (1997) *Wild flowers of Northern South Africa.* Fernwood Press, Vlaeberg, South Africa.
Gh	Ghazanfar S.A. (1989). *Savanna plants of Africa: an illustrated guide.* Macmillan, London.
HL	Haines R.W. & Lye K.A. (1983). *The sedges and rushes of East Africa. A flora of the families Juncaceae and Cyperaceae in East Africa – with a particular reference to Uganda.* East African Natural History Society, Nairobi.
Ib	Ibrahim K.M. (1989). *An illustrated manual of Kenya legumes.* Field Document KEN/84/007, FAO/UNDP Forage Plant Development and Extension, National Agriculture Research Centre, Kitale, Kenya.
IK	Ibrahim K.M. & Kabuye C.H.S. (1988). *An illustrated manual of Kenya grasses.* Food and Agriculture Organization, Rome, Italy.
Pa	Palgrave K.C. (1996). *Trees of Southern Africa.* Struik Publishers, Cape Town.
Th	Thulin M. (1983). *Leguminosae of Ethiopia.* Opera Botanica 68, Council for Nordic Publications in Botany, Copenhagen.
FtEA	Turrill W.B. & Beentje H. (eds) (1952-2007). *Flora of tropical East Africa* (series). Royal Botanic Gardens, Kew, UK.
Wy	Van Wyk P. (1996). *Field Guide to the trees of the Kruger National Park.* Struik Publishers, Cape Town.
WW	Van Wyk & van Wyk

2.2. Checklist of plant families at SNP

The "Checklist of Plant families at SNP" contains a list of families occurring in East Africa.

Column "Family":
Lists the names of plant families occurring in East Africa.

Column "FtEA existing":
Provides information about whether an FtEA volume covering the family exists or not.

Column "check":
Provides information on whether the FtEA volume has been checked for species that are potentially occurring at SNP.

Column "comment":
Provides more specific comments, regarding the checking of plant families for species as per August 2007.

2.3. FtEA spp checklist (main plant families)

The "FtEA spp checklist (main plant families)" was composed in the year 2002 by employed students of the computer school of Mr. James Lyamba in Dar es Salaam (through a commission by Dr. Roland Cochard). The students entered all the species of the FtEA volumes of the main plant families, namely the Poaceae (Gramineae), Caesalpiniaceae, Mimosaceae and Papilionaceae (all three Leguminosae volumes), Rubiaceae and Annonaceae into the database. For these families (for which potential "pot" species have not been entered into the "SNP plant species database") this database can be used to scan for other potential species that may be occurring within the area of SNP. Note that the database has not yet been thoroughly edited, and that some information may be inadequate.

Column "Species":
Lists the plant species name.

Column “Subsp”:
Lists any subspecies name of a plant species.
Column “Family”:
Lists the plant family name.
Column “Reference”:
Lists the year of the publication of the corresponding FtEA volume.
Column “Elevation”:
Lists the lower elevation of the distribution range of a species. A ‘0’ therefore means that the species has been found close to sea level; above about ‘400’ a species is unlikely to occur in SNP. It has been found that in some columns the higher elevation limit has been entered into the database, so this data may not always be reliable.
Columns “DistributionK3”, “DistributionT3” and “DistributionT6”:
Shows the distribution of the species according to FtEA. A tick in K3 means that the species has been found in the coastal areas of Kenya (between Somalia and Tanzania), T3 in the northern coastal strip of Tanzania (between the Kenyan border and about Mkwaja), and T6 south of Mkwaja.
Column “Habitat”:
Contains notes from FtEA on the habitat where the species occurs (often incomplete, to be certain check the literature).

2.4. Checklist of potentially occurring Cyperaceae spp

The “Checklist of potentially occurring Cyperaceae spp” contains a list of potentially occurring sedge species in the area. This list is based on the reference Haines & Lye (1983).

Column “Species”:
Lists the plant species name.
Column “Synonym”:
Lists any synonym name.
Column “Habitat”:
Contains notes on the habitat of the species (according to Haines & Lye 1986).
Column “SNP notes (RC)”:
Contains notes by RC regarding the presence of the species in SNP.

2.5. Some final notes

For species of several plant families information is still very limited. This mainly applies to families for which an FtEA volume or other useful literature reference does not exist, such as the Commelinaceae, Lamiaceae and Malvaceae, which are represented by several species at SNP. The only way to identify the species may currently be to send collected specimens to a national or international herbarium.

Dr. Urs Bloesch and Prof. em. Dr. Frank Klötzli have recently collected plant material at Kwedijela Forest (mainly inside SNP) and in Mgulwi Riverine Forest (a forest near Kwamsisi close to SNP). The identification of the material will probably soon add several new species to the database. The material also includes several species of ferns; in a newer version of the databank the pteridophytes may be included.

Zürich, 26. 08. 2007

Dr. Roland Cochard