



USEFUL TREES AND SHRUBS FOR UGANDA

Identification, Propagation and
Management for Agricultural and
Pastoral Communities



A . B. Katende
with Ann Birnie and
Bo Tengnäs



RELMA

Useful Trees and Shrubs for Uganda

Identification, Propagation and Management
for Agricultural and Pastoral Communities

A B Katende, Ann Birnie and Bo Tengnas

REGIONAL SOIL CONSERVATION UNIT (RSCU)

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Top: Trees near the home are easy to look after and provide shade, beauty and useful products

Bottom: A panoramic view of a Ugandan Landscape

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Foreword

This book is the fourth in a series covering the countries of East Africa published with support from SIDA through the Regional Soil Conservation Unit. The corresponding handbook for Kenya was published by ICRAF in 1992 with financial support from SIDA and technical input from RSCU professionals. The succeeding volumes for Ethiopia and Tanzania were published by RSCU in 1993 and 1994, respectively, and produced in close collaboration with relevant institutions and individuals in each country.

The major aims of these handbooks are to document the useful tree and shrub species of the region and to provide information to subject-matter specialists, extension workers, institutions and farmers on species that have production and conservation potential for small-scale farmers in the region.

The present book covering Uganda contains even more species than the earlier ones, mainly due to three factors. Firstly, Uganda is extremely rich in tropical species. Secondly, RSCU found a Ugandan co-author, A-B. Katende, who has an enormous amount of knowledge about the trees of Uganda; knowledge that he willingly made available for the production of the book. Thirdly, more forest species have been covered than in the earlier books which concentrated more on the agricultural and pastoral settings. With growing worldwide interest in the Uganda rain-forest ecosystems, the authors felt it was important also to include species from a biodiversity conservation point of view. Thus the size of this book may not be as handy as one would wish, but RSCU felt it was important to include as much of the available information as possible.

Bo Tengnas, a former RSCU staff member now working as an agroforestry consultant, and Ann Birnie, a Nairobi-based botanist, teacher and illustrator, have contributed substantially to the production of the book and done the technical editing. Mrs Birnie has also organized all the illustrations.

RSCU publishes this handbook in the hope that it will be widely used by individuals, extension workers and educational and research institutions in order to foster a greater interest in the growing and management of a wide range of trees and shrubs as part of the development of sustainable farming systems in different ecological zones of Uganda.

Erik Skoglund
Director, Regional Soil Conservation Unit
Nairobi, August 1995

Acknowledgements

Most of the material for this book was gathered by A.B. Katende over many years of work on the taxonomy and other aspects of trees and their uses in Uganda and during a period of extensive travel in Uganda specifically for this book. Discussions were held with people knowledgeable on trees and shrubs, among whom were many farmers and pastoralists. In fact, most of the information in this book derives from rural people in East Africa who have enthusiastically shared their knowledge with us.

Special thanks go to M. Kayondo, Principal Forest Officer, and J.R. Kamugisha, Forest Officer, both of the Uganda Forest Department, who liaised between RSCU and Mr Katende. Thanks are also due to the Dean of the Faculty of Science, Makerere University, who made a Faculty car available for the field work, and to the Head of the Botany Department who gave permission for Mr Katende to work on this book.

Much of the text and many illustrations are from RSCU's companion volumes for Kenya, Ethiopia and Tanzania. Several people contributed to the production of those books and we acknowledge their contributions to this volume covering Uganda.

Illustrations

The majority of the plant illustrations are original drawings by Ann Birnie, many taken from *Trees of Kenya* by T. Noad and A. Birnie. Other drawings have been done specially for this book, both from fresh material and from dried specimens either at Makerere University Herbarium, Kampala, or at the East African Herbarium, Nairobi.

Margaret Nagawa and David N. Kato, both Kampala artists, contributed to these drawings. Louise Gull in Nairobi contributed four drawings and those of the following species were originally published in the children's magazine *Rainbow* (Stellagraphics Ltd., Nairobi): *Ricinus communis*, *Senecio hadiensis*, *Senna didymobotrya*, *Solanecio mannii* and *Vernonia auriculifera*. A few drawings have been taken from *Plants in Zanzibar and Pemba* by R.O. Williams and *Kenya Trees and Shrubs* by I.R. Dale and P.J. Greenway. More have been used from the earlier volume, *Indigenous Trees of the Uganda Protectorate* by W.J. Eggeling (1951). A few further illustrations have been taken from *Know Your Trees* by A.E.G. Storrs. Unfortunately, it has not been possible to view the important timber trees of the Uganda forests in their natural setting, nor, within the limitations of this book, to illustrate their towering and majestic forms.

We acknowledge with thanks the Royal Botanic Gardens, Kew, for permission to use several illustrations that appear in the published family volumes of the *Flora of Tropical East Africa*. The copyright to all the illustrations above remains with the original publishers. RSCU would also like to acknowledge the other sources of material listed in the bibliography.

Staff of the East African Herbarium at the National Museums of Kenya in Nairobi were most helpful in availing specimens from their collection to facilitate the drawing of the illustrations. They were also extremely helpful in providing taxonomic information. The Nitrogen Fixing Tree Association assisted us with confirmation of species that are known to be nitrogen fixing.

Thanks are due to Yasmin Kalyan who cheerfully and tirelessly entered the first draft on computer.

Finally, a word of thanks to the Swedish tax payer who, through SIDA, provided the funds necessary for the production of this handbook.

..

Introduction

Biodiversity in Uganda

Uganda is the richest of the East African countries in terms of biodiversity, and even in a global context it is regarded as one of one of the important centres of biodiversity.

The country can be divided into several biogeographical zones:

- Sudano-Congolean (north)
- Somali-Maasai (north-east)
- Guinea-Congolean (west, south-west)
- Afro-montane (mountains)
- Transition (north-western)
- Lake Victoria basin (regional mosaic).

Although there are not many species that are strictly endemic to the country, the flora is still of great importance because of its major contribution to regional endemism. The Western Rift Valley, as well as the areas around Lakes Edward and Victoria, much of which are within Uganda, are particularly important as many species that occur here are not found anywhere else in the world.

Climatic and physical conditions vary a great deal within short distances in Uganda. Areas at higher altitudes have reliable rainfall that can support montane rain forests and most areas of the country have sufficient rainfall to support agriculture, A large proportion of the land area is now under cultivation.

Reconstructed vegetation maps of Uganda indicate that before the advent of settled agriculture, a considerable part of the land surface was covered by forest and all the rest of the country was covered with thicket or wooded savanna, except Karamoja where the nature of the original vegetation is uncertain.

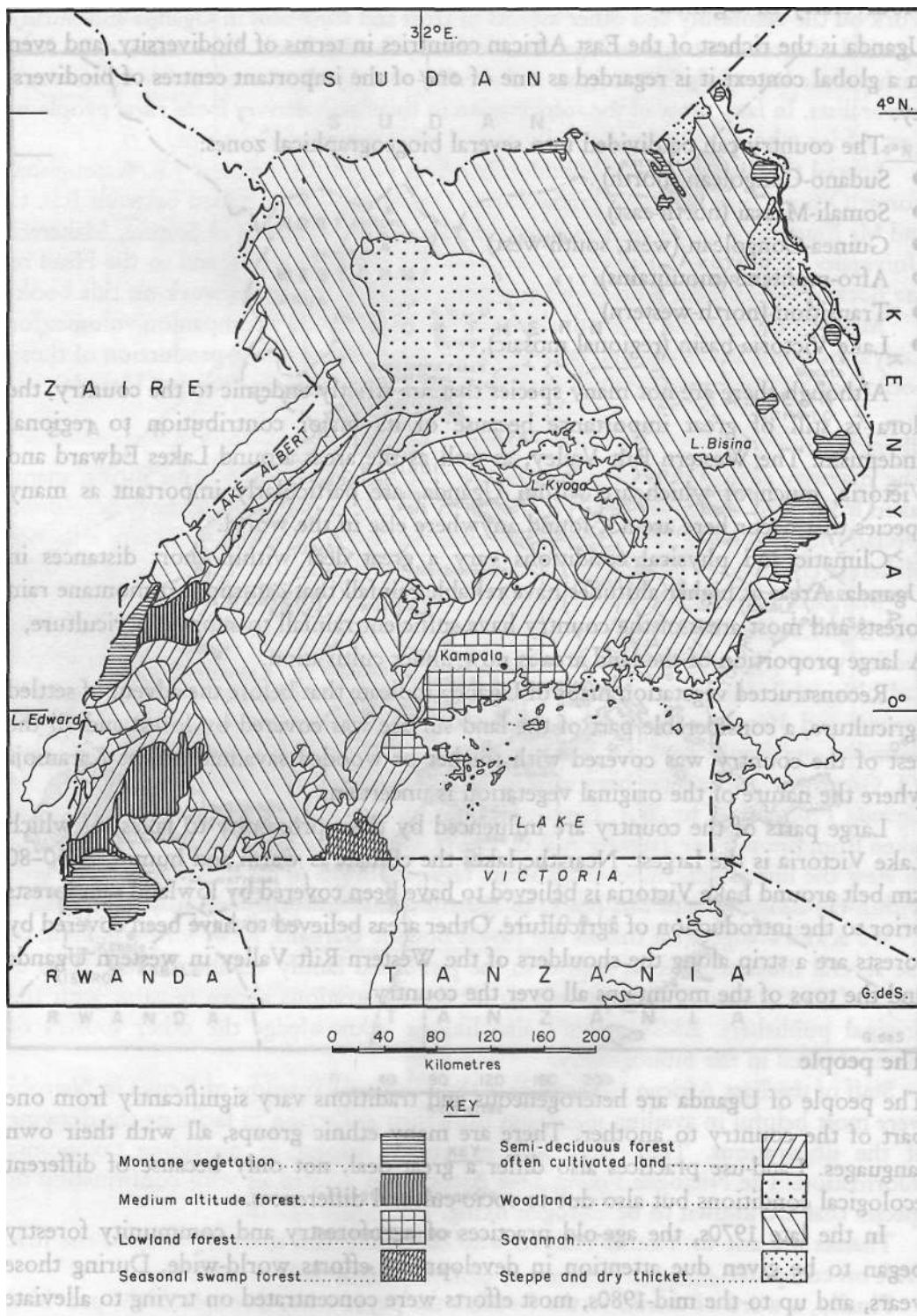
Large parts of the country are influenced by their proximity to lakes, of which Lake Victoria is the largest. Near the lakes the climate is warm and humid. A 50-80 km belt around Lake Victoria is believed to have been covered by lowland rain forests prior to the introduction of agriculture. Other areas believed to have been covered by forests are a strip along the shoulders of the Western Rift Valley in western Uganda and the tops of the mountains all over the country.

The people

The people of Uganda are heterogeneous and traditions vary significantly from one part of the country to another. There are many ethnic groups, all with their own languages. Land-use practices also differ a great deal, not only because of different ecological conditions but also due to socio-cultural differences.

In the late 1970s, the age-old practices of agroforestry and community forestry began to be given due attention in development efforts world-wide. During those years, and up to the mid-1980s, most efforts were concentrated on trying to alleviate the fuelwood problem by intensified tree planting, but due to the political turmoil in

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Map 3. The main vegetation zones of Uganda

Uganda little support was provided by the Government to farmers during those years. More recently, however, numerous projects have been aimed at supporting and developing local farmers' tree-growing efforts.

Forestry has been important in Uganda since colonial times. Makerere University has a well-established Faculty of Forestry which had been the leading centre for forestry studies in East Africa prior to the establishment of universities in Kenya and Tanzania. Logging and sawmilling were important activities in colonial times and have recently grown in importance once more. Management of soft-wood plantations with exotic species received much attention, while indigenous forests were subject to harvesting but given less attention in terms of sustainable management. Forestry activities in the indigenous forests have constituted a threat to biodiversity, and several valuable forest species have become rare and threatened.

Gradually officers in development projects world-wide, as well as researchers, have come to realize that the priorities of farm families often differ from those project designers initially anticipate. It is now felt that development agendas must be worked out with the rural people concerned if the projects are to give sustainable results. Methods such as diagnosis and design (D&D) developed by ICRAF, and PRA participatory rural appraisal (PRA) by the International Institute for Environment and Development are promoted. All these methods are based on development workers' awareness that the local people always have a wealth of knowledge that needs to be the focal point of efforts to improve agroforestry or tree growing in general.

All too often, however, development workers, whether foreign or national, do not communicate effectively with local people on issues related to trees. There is often a language barrier if the two groups do not have a common set of names for the trees and shrubs that they deal with. Even if English is understood by many people in Uganda, there are obvious limitations to communicating in that language when discussing the details of a land-use system. Recognition of this communication gap between extension workers and farmers, the need to regard local farmer's experience as a focal point in any efforts to improve land use, and the importance of utilizing and preserving tree biodiversity in Uganda were the underlying concepts for this book.

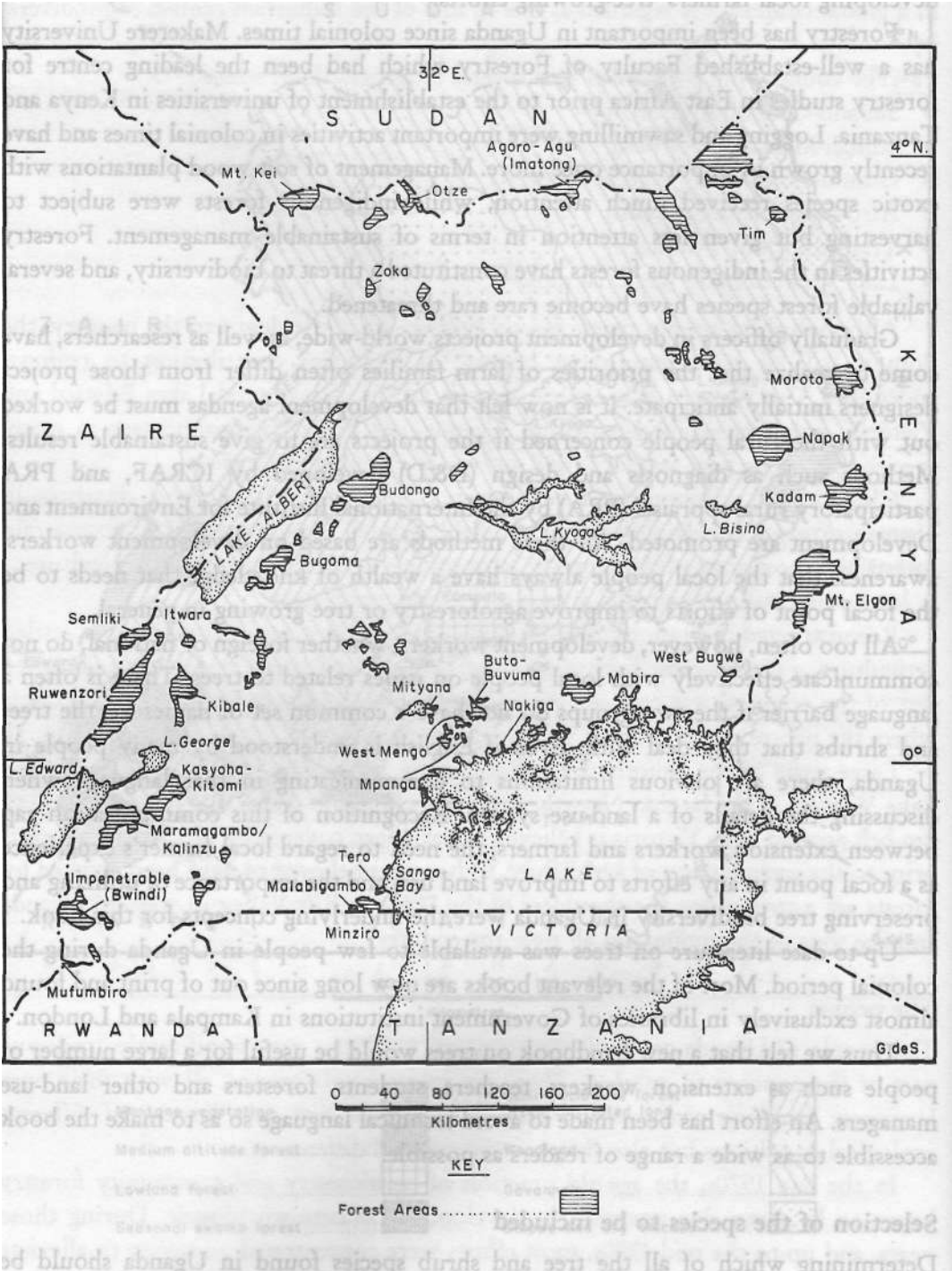
Up-to-date literature on trees was available to few people in Uganda during the colonial period. Most of the relevant books are now long since out of print and found almost exclusively in libraries of Government institutions in Kampala and London.

Thus we felt that a new handbook on trees would be useful for a large number of people such as extension workers, teachers, students, foresters and other land-use managers. An effort has been made to avoid technical language so as to make the book accessible to as wide a range of readers as possible.

Selection of the species to be included

Determining which of all the tree and shrub species found in Uganda should be included and which omitted was a difficult task. Based on the authors' knowledge

USEFUL TREES AND SHRUBS FOR UGANDA



Map 4. The main forests of Uganda

coupled with farmer's knowledge obtained during extensive field visits and consultations, certain species have emerged as being important to many groups of people. During the selection process both indigenous and exotic species have been considered, and it was also decided to include a few species which are not strictly trees but giant herbs or grasses, e.g. bamboos, *Agave sisalana* and banana. Some tree species have been included because of their ecological value or due to their potential forestry value although they may not be of prime importance for local communities. Many of these are tropical rain forest species. A few other species have been included because they are potentially useful but becoming very rare and close to extinction due to over exploitation or other habitat changes.

Vernacular names

The average farmer in Uganda seldom uses the English or Latin names for the trees and shrubs that he is familiar with; the local languages are still most commonly used and will continue to be for a long time. Old people often have much more knowledge about the trees and shrubs of their areas than the younger generation. Therefore it is important that researchers and development workers wishing to elicit information about local plants use the vernacular names that will be familiar to the older people in the local community. When this handbook was developed, therefore, it was decided to include as many vernacular names as possible, although there are some areas of the country that have been poorly covered so far in this respect and where further research is needed.

Ecology

Under this heading a brief description of the origin and present distribution of the species is given, followed by an indication of where it grows in Uganda and, where possible, information on the altitudinal range, preferred climatic and soil conditions, etc.

Uses

Trees and shrubs provide a wide range of benefits to man, both in terms of products such as timber or medicine and services such as shade or soil improvement. Such information has been summarized for each species under this heading. It must be stressed, however, that these are *reported* uses, i.e. what the local people say they use these plants for and it has not been possible to verify the accuracy of all such reports. In addition, the known uses of a particular species may vary from one part of the country to another, or even from one community to another, and therefore it is always necessary to verify these uses with the local people.

It must also be understood that the species cannot be grown for all of the possible uses simultaneously. On the contrary, management of a species often aims at optimizing or maximizing a specific product or service.

Description

For each species there is a general description followed by a detailed description of habit, bark, leaves, flowers and fruit. As far as possible, technical botanical terms have been kept to a minimum. The features in bold type indicate the special points to look for when identifying a species. It may not always be possible to identify a species from the descriptive text alone, but it is anticipated that, together with the illustrations and the vernacular names, the descriptions will prove a practical guide to species identification in the field.

Under this heading attention has been focused on management of individual trees in a farming or pastoral context. Thus, normal forestry operations such as clearing, thinning and pruning are not covered. For information on these aspects, the reader should consult standard forestry handbooks. Whether or not a species is suitable for intercropping with agricultural crops is indicated as is information on whether the species does well if planted as a woodlot or pure forest stand.

Propagation

Wherever information on suitable methods of propagation is available it is given under this heading. "Seedlings" indicates that a relevant propagation method is raising seedlings in a nursery, either on farm or in a central or group nursery. "Wildings" indicates that it is known that farmers propagate a certain species by collecting wildings and transplanting them at the desired site. Other species may be propagated by direct sowing of seeds at the desired site, and vegetative propagation by cuttings is recommended for others. Coppicing is a management practice rather than a method of propagation, hence coppicing ability is indicated under "management".

Seed information

When relevant, information on number of seeds per kilogram, whether seeds can be stored or not, and suitable pre-sowing treatment is given. Normally, storage of seeds is to be avoided. The storage periods indicated are deliberately imprecise because there is no fixed period during which seeds can be stored without harm and after which they all lose viability. Loss of viability is a gradual process, and its speed depends on many factors, mainly the storage conditions. Hence, only approximate indications of acceptable storage periods can be given.

If seeds are to be stored for some time it is always best to keep them in a cool, dry and insect-free place.

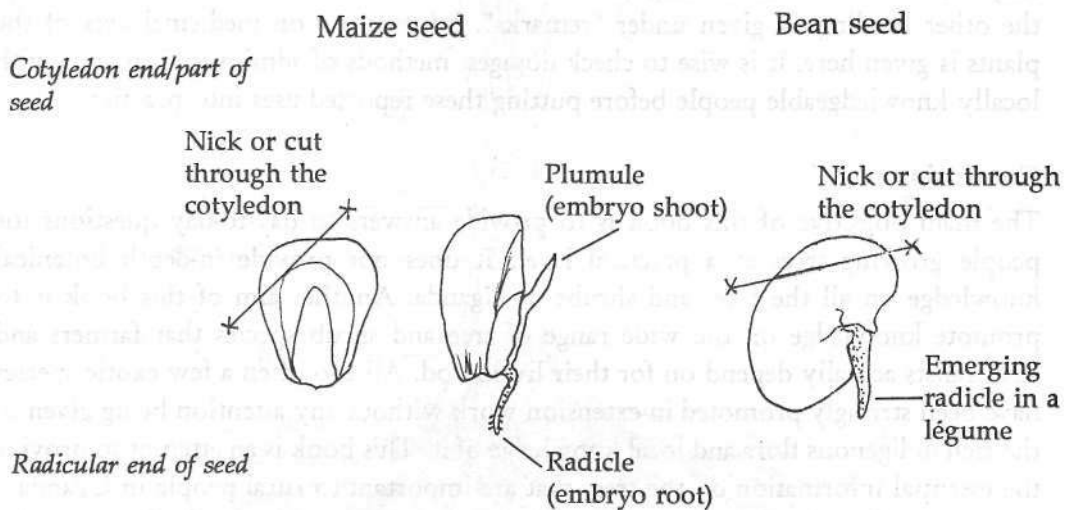
Seed pre-treatment to render viable but dormant seeds fit for germination can be carried out in a number of ways. The methods mentioned in this book are the simple ones that can be applied under field conditions without the use of sophisticated equipment or chemicals.

Seed treatment is not needed for all species. For many, however, treatment may enhance both the rate and the speed of germination. The most common methods are

soaking in hot or cold water, nicking, and de-winging. In addition, floatation can be mentioned as a simple way of separating bad (empty and thus light and floating) from good (heavy and sinking) seed.

Soaking in water is recommended for many species and, where these are known, details of temperature and time are indicated.

Nicking can be done by removing small pieces of the seed coat at the distal (cotyledon) end of each seed using a sharp tool such as a knife or nail clipper. Removal of the hard coat next to the storage tissue of the seed speeds up the absorption of water and hence the growth of the embryo. Nicking is time consuming if it is to be done to a large number of seeds, and soaking is often a more convenient alternative. Furthermore, nicking must be done with care in order to avoid damaging the vital part of the seed, i.e. the embryo itself.



The cotyledon and radicular ends of a seed and how to nick the seed

Winged seeds should normally be de-winged before sowing (e.g. *Combretum*, *Terminalia*, *Tipuana tipu*).

In some species germination is enhanced if the hard seed coat is cracked. This is a delicate operation as it is easy to damage the embryo within the seed.

As a general rule, fruits with a fleshy pulp surrounding the seeds will germinate better if the pulp is removed and the seed cleaned before sowing. Seeds of this kind often cannot be stored and should be sown soon after collection and cleaning.

Management

Different management techniques allow tree growers to maximize the production (both products and service functions) from trees and shrubs. Management may also be applied in order to reduce negative side effects from the presence of trees or shrubs, e.g. shading effects on adjacent crops.

The most common management practices are coppicing, lopping, and pollarding. Whenever a certain management technique is known to be feasible for a certain species this is indicated. Under this heading information on growth rate is also given.

Under this heading attention has been focused on the individual tree management in a farming or pastoral context. Normal forestry operations like clearing, thinning and pruning have thus not been indicated. Reference is made to forestry handbooks for such information. Information on whether or not the species is suitable for intercropping with agricultural crops has been included when known, and so has information on whether or not the species does well if planted as a woodlot or pure forest stand.

Remarks

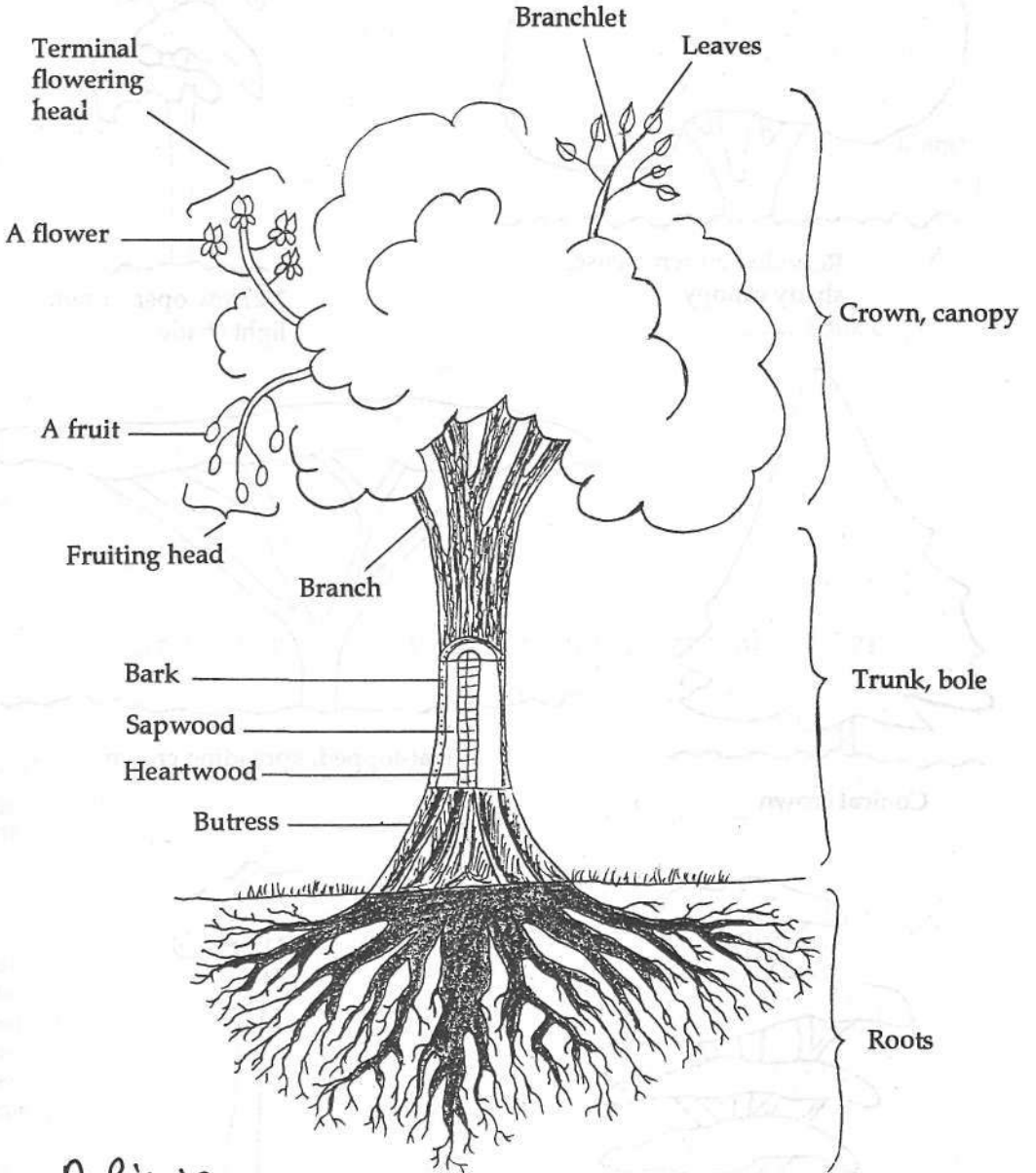
Any other useful or interesting information that is not relevant for inclusion under the other headings is given under "remarks". Information on medicinal uses of the plants is given here. It is wise to check dosages, methods of administration, etc., with locally knowledgeable people before putting these reported uses into practice.

Conclusion

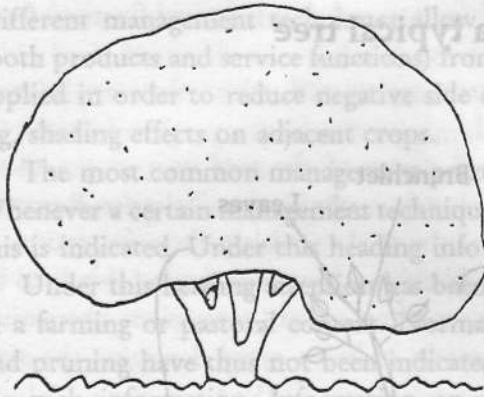
The main objective of this book is to provide answers to day-to-day questions for people growing trees at a practical level. It does not provide in-depth botanical knowledge on all the trees and shrubs of Uganda. Another aim of this book is to promote knowledge on the wide range of tree and shrub species that farmers and pastoralists actually depend on for their livelihood. All too often a few exotic species have been strongly promoted in extension work without any attention being given to the rich indigenous flora and local knowledge of it. This book is an attempt to provide the essential information on the trees that are important to rural people in Uganda.

Any reader who feels he can contribute to an improved second edition of this book is urged to do so by using the forms at the back.

The parts of a typical tree



Tree shapes



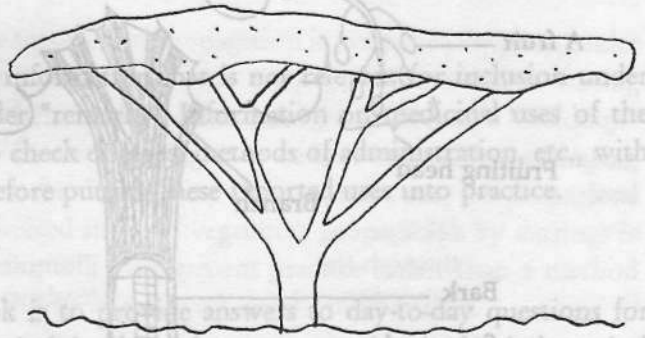
Rounded crown, dense, shady canopy



Narrow open crown, light shade



Conical crown



Flat-topped, spreading crown



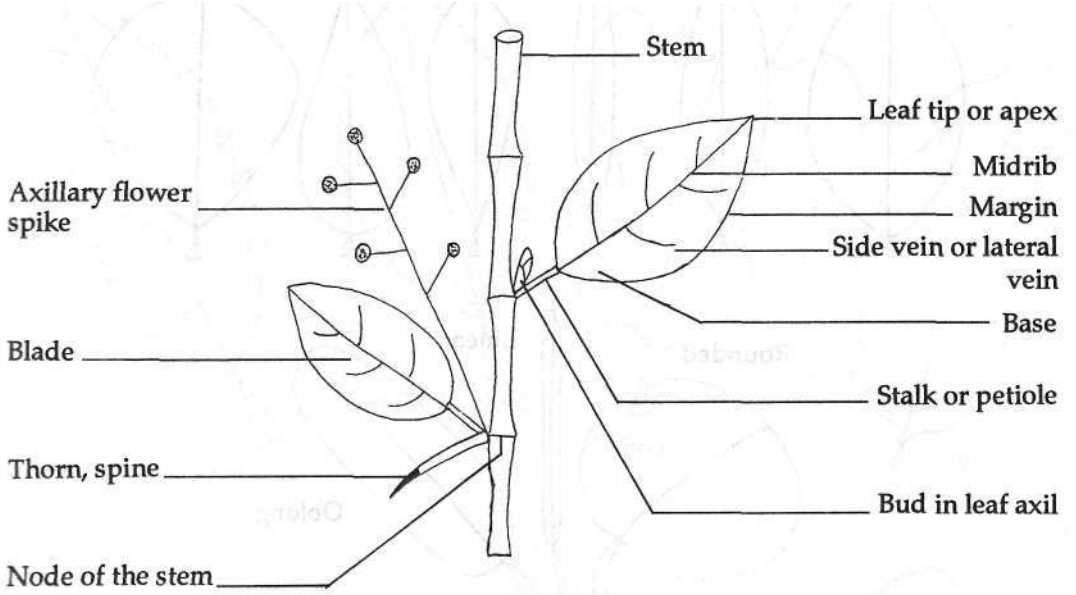
Canopy in layers



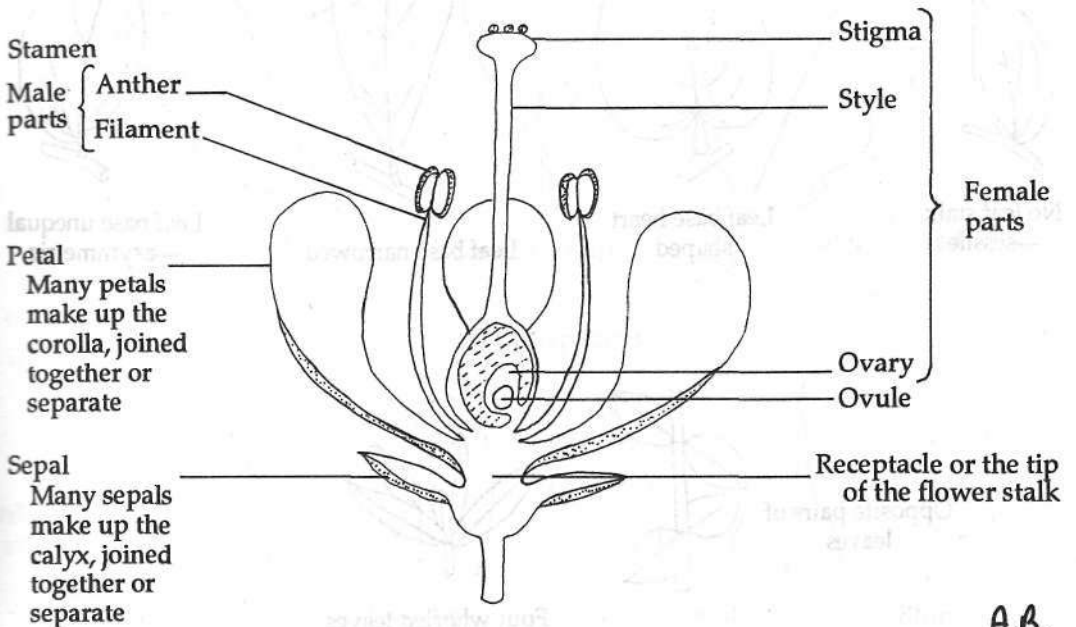
A tall bole, small dense crown

Leaves and stems

Diagram showing two **simple leaves** alternate on a stem



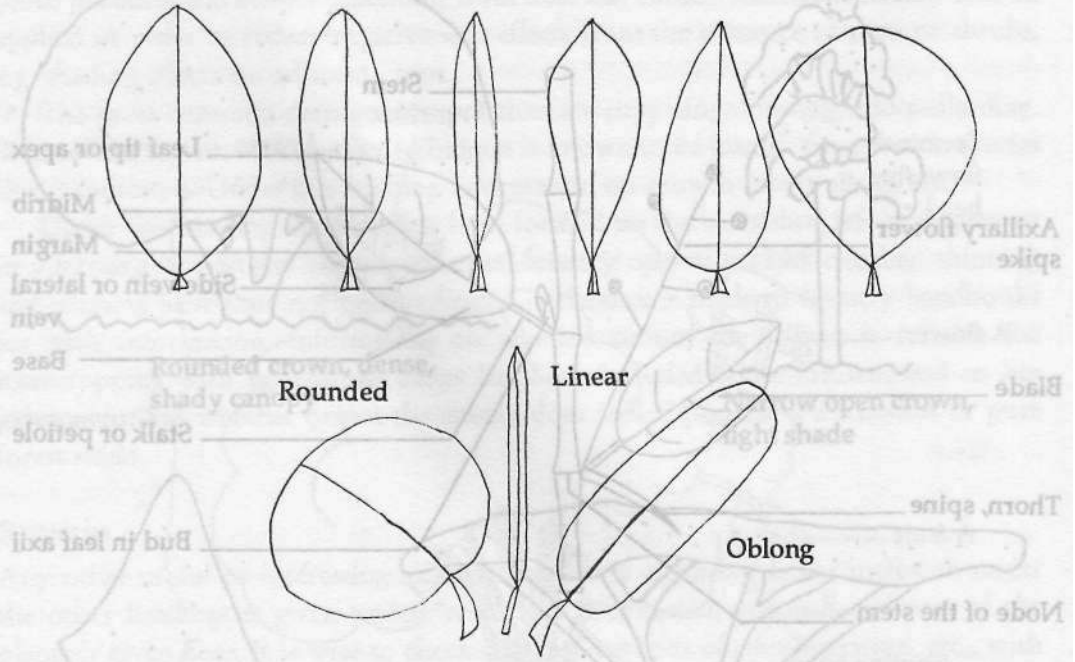
A diagrammatic section through a typical flower



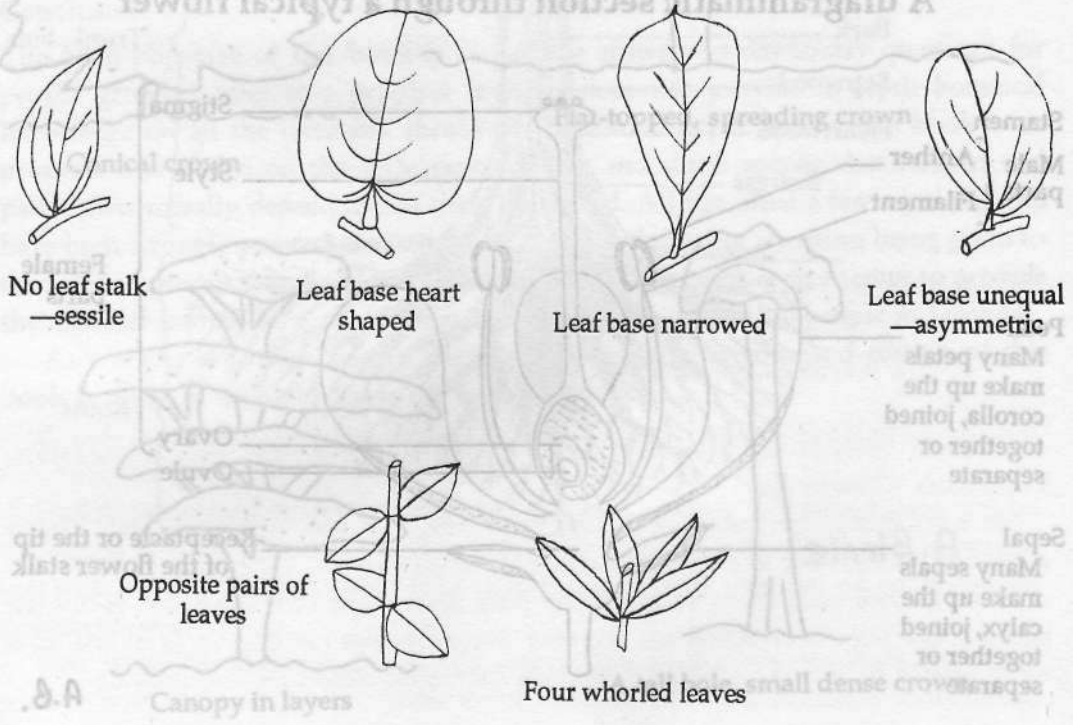
A.B.

Leaves

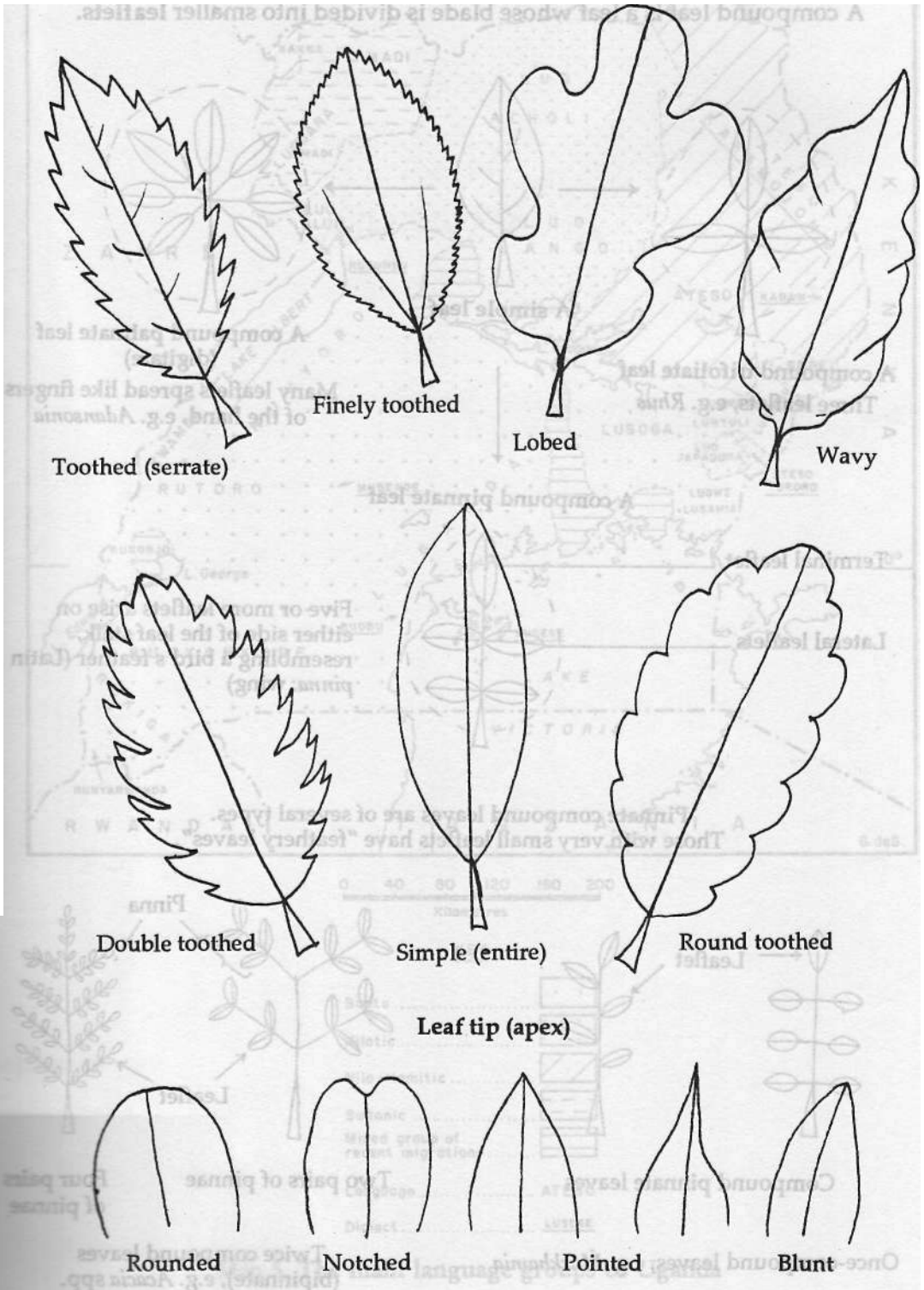
A variety of simple oval-shaped leaves



Leaf base

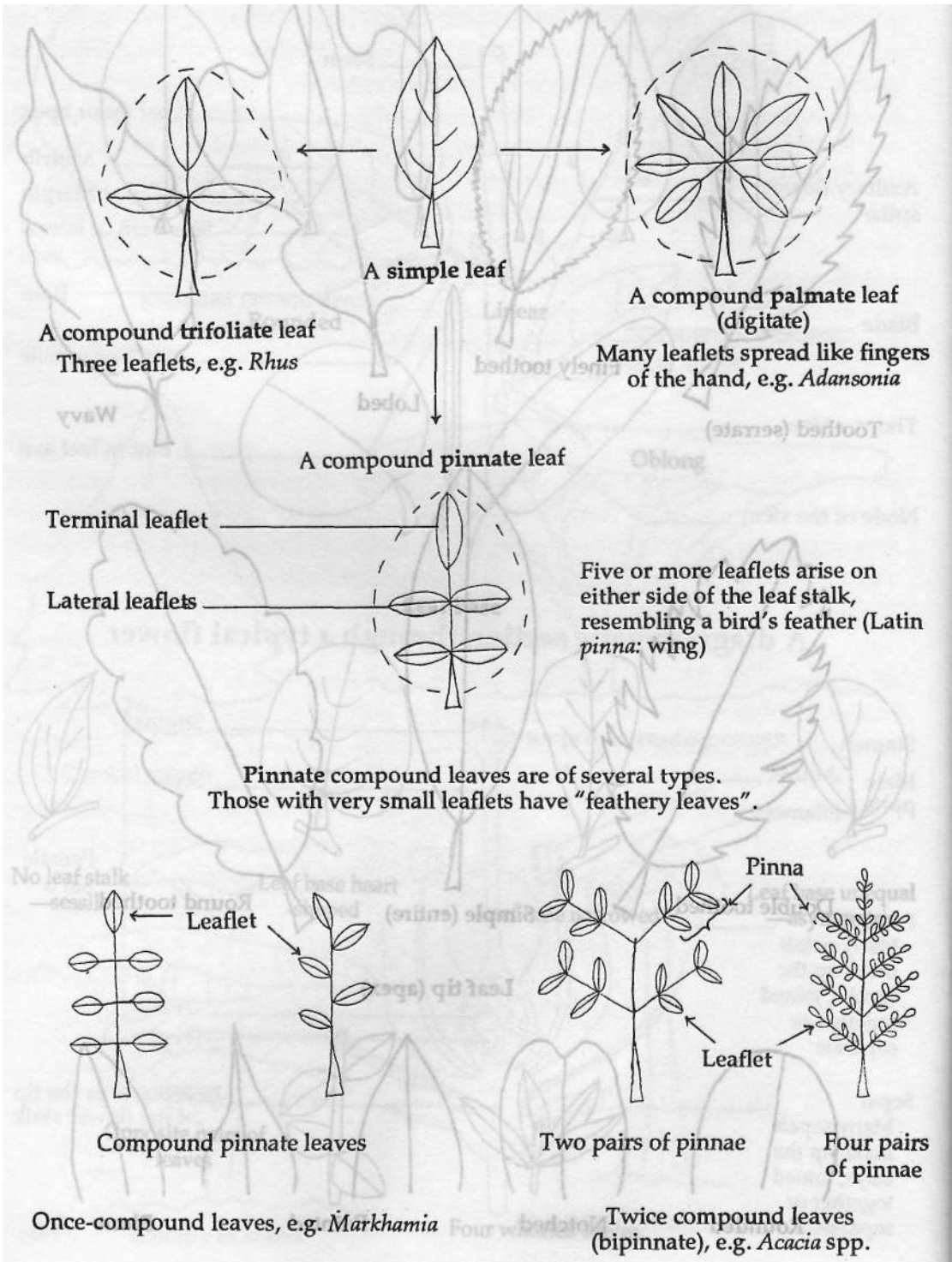


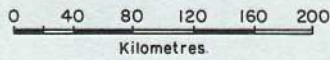
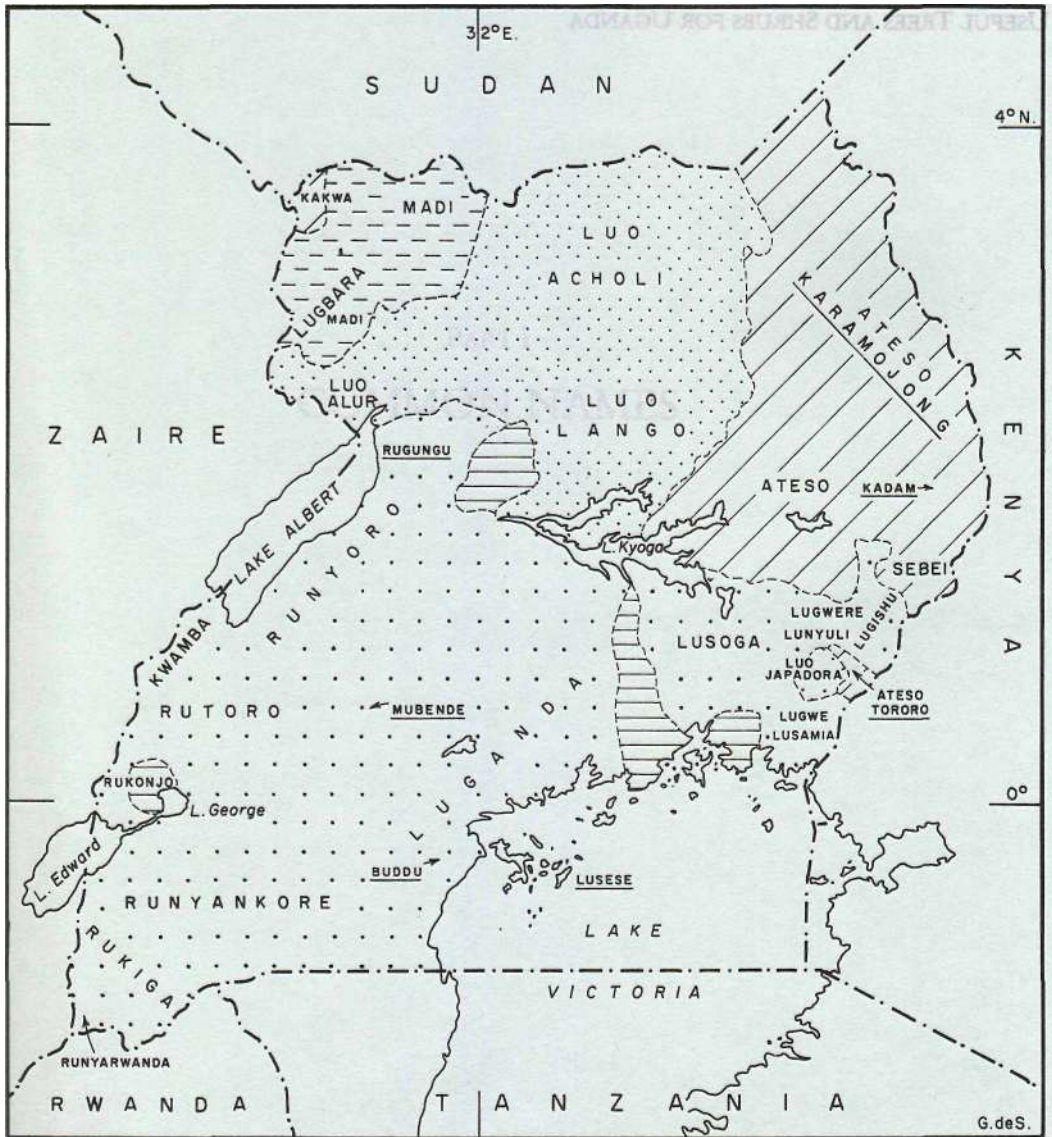
Leaf edge (margin)



Leaves may be simple or compound.

A compound leaf is a leaf whose blade is divided into smaller leaflets.





KEY

Bantu	
Nilotic	
Nilo-Hamitic	
Sudanic	
Mixed group of recent migrations	
Language	ATESO
Dialect	<u>LUSESE</u>

Map 5. The main language groups of Uganda

