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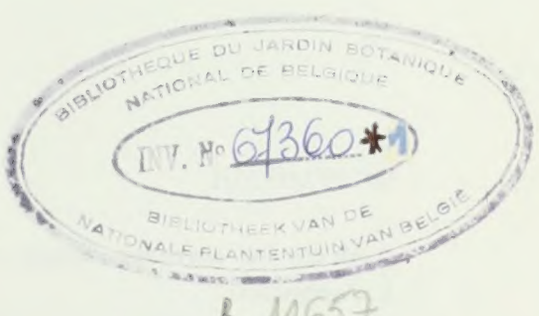
a literature survey



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ABSTRACT

African peoples south of the Sahara have a tradition of eating wild mushrooms. Their knowledge of the edible species is mostly very good. In contrast, the scientific knowledge of macromycetes is rather weak and almost limited to the species treated in the *Flore Iconographique des Champignons du Congo*, the *Flore Illustrée des Champignons d'Afrique Centrale* and *A preliminary agaric flora of East Africa*. Up to now, little attention has been given to edibility of mushrooms. The present work surveys published information on importance, nutritive content, knowledge, collecting, trade, culture, local traditions, new introductions and preparation for eating, and lists 300 species whose edibility has been explicitly mentioned in the literature.

RÉSUMÉ

Traditionnellement, les peuples africains au sud du Sahara consomment des champignons sauvages dont ils ont une assez bonne connaissance. Par contre la connaissance scientifique des macromycètes africains est encore assez fragmentaire et presque limitée aux espèces traitées dans la *Flore Iconographique des Champignons du Congo*, la *Flore Illustrée des Champignons d'Afrique Centrale* et *A preliminary agaric flora of East Africa*. Jusqu'à présent, la comestibilité des champignons a peu retenu l'attention. La présente revue bibliographique envisage successivement: l'importance des champignons comestibles, leur valeur nutritive, leur connaissance par la population, leur récolte et leur culture, les marchés, les traditions locales, les introductions récentes et les préparations culinaires. Nous donnons ensuite une liste de 300 espèces dont la comestibilité a été explicitement mentionnée dans la littérature.

ACKNOWLEDGEMENTS

The authors wish to thank everybody who contributed to the work in giving information towards published sources. Without their help this review should have been much more incomplete. Complementary information will always be acknowledged. The present information is considered only as a first step towards a better knowledge of edible African species.
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1. Our knowledge

The poor knowledge of edible African fungi

The edible fungi of Africa south of the Sahara are ill-known. Basically, the knowledge of all fungi of Africa is very poor, the difficulties of collecting and of studying being partly responsible for this situation. For the time being, there are no local African mycologists specialising on macrofungi. Our information is based largely on reports by Europeans which often have poor or no access to the primary source of information, the local peoples. Furthermore, the literature on edible fungi is often rather old[1]. Combined with a mycophobia of English-speaking people, above reasons provide for the poor state of our knowledge of edible fungi of Africa.

A particular case is South Africa. Several publications treat edible fungi, mostly using the same basic data. It is of particular interest to note that the mycoflora of South Africa is relatively poorly known. As observed by Pearson (103), this flora has strong resemblances to the European mycoflora. From the work of Doidge (29) it is obvious that many of the typical South African vegetation types have not yet been studied mycologically and in recent times there seems to have been no changes in this situation. We have the impression that mycologists have concentrated on fungi from exotic forest plantations of pine, oak, eucalypt and poplar. These forests seem to have mycorrhizal fungi which are typically European or originating from other temperate regions or Australia (84).

Another observation is that the indications about edibility in South Africa seem to be primarily based on the experience of the white populations, not giving a complete picture of the use of edible fungi. According to the literature (38, 136) they considered macrofungi with suspicion; only a few species are known to have names in Afrikaans. The interest in fungi is, however, growing steadily, as demonstrated by the increasing demands for information received by the various universities in the country (136).

From correspondence we have with scientists in Africa, the growing interest in macrofungi and in their culture is a general feature for the whole of the continent.

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[1] One of the oldest citations about edible fungi in Africa is made by Livingstone in 1857 in his journals (108); reference is made to the edible *Termitomyces* species and to what is probably a *Russula* species.

A lack of basic documentation

Determining fungi from Africa is very difficult because of the lack of basic documentation. For most of the groups there are no monographic treatments, or the treatments are very incomplete due to the lack of good material. As a result, everybody has to go through the very dispersed literature. The need for a critical mycoflora for tropical (121) and southern Africa (137) is very high. Due to this unfortunate situation, names were often put on collections using European or other floras. The names resulting from such attempts have to be considered as the best possible approximations. A very good example results from the study of the African *Russula* species by Buyck (17), who concludes that names of European taxa have been erroneously applied to African collections. **One has to be aware of the relative value of the names published** which therefore have to be accepted with caution.

In reviewing the literature it became obvious that many determinations were based on comparison of macroscopical aspects of the carpophores. The fact that in some genera microscopy is essential to arrive at a sound and well-based identification is a second reason why the names published have often to be considered only as approximations.

This lack of knowledge and the lack of good popularisation of the scientific knowledge has already led to severe cases of poisoning, as those described for South Africa (137).

2. Importance of fungi as food for the local populations

Most indigenous populations in Africa eat mushrooms. References are known from:

Africa (general) (19, 34, 72);
Tropical Africa (54, 55, 73, 149, 151);
West Africa (45):
- Burkina Faso (46);
- Ivory Coast (45, 77);
- Ghana (23, 70, 80, 119, 123);
- Nigeria (1-4, 94, 97-99, 150, 151);

Central Africa:
- Cameroon (66-69);
- Gabon (140);
- Central African Republic (19, 50-53);
- Congo (27, 41);
- Zaire (8-13, 23, 25, 28, 37, 49, 56-63, 71, 75, 83, 92, 93, 100, 101, 108, 125, 131);
- Angola (109, 141);

East Africa (65):
Somalia (45);
Uganda (91, 96, 127);
Kenya (111);
Tanzania (32, 42); Zanzibar (65, 105);
Malawi (7, 20, 21, 86-89, 124, 145-148);
Zambia (5, 97, 110, 112-118, 132, 139, 143);
Zimbabwe (33, 122);
Madagascar (15, 16, 30, 44, 45, 47, 52, 104); Mauritius (104-107); Réunion (105);
Southern Africa:
Kalahari desert (33, 79, 81, 130);
Namibia (33, 138);
Botswana (39);
South Africa (14, 29, 33, 38, 66, 76, 78, 82, 103, 106, 128, 134-137, 141, 142);
Lesotho (40).

It is evident that our knowledge is very uneven. The best known countries are:

the French speaking countries where Heim has worked (43-55),
Nigeria (Oso: 97-99, Zoberi: 149-151),
Malawi (Morris: 85-89; Williamson: 145-148),
Zambia (Pegler: 108-110, Piearce: 112-118),
Zaire (covered by *Flore Iconographique des Champignons du Congo* and *Flore Illustrée des Champignons d'Afrique Centrale*).

In certain regions, at least during some period of the year, fungi are very important as a food source. This is certainly true in the Zambesian woodland, where enormous quantities are consumed. In Upper Shaba (Zaire) the consumption is estimated at 20 tonnes a year (101) (about 30 kg a year for a villager and 15 kg for a townsman) (23). In Malawi over sixty species of edible mushrooms are recognised (88), and it is obvious that here again very large quantities are consumed. In other regions as well, indications are found that fungi are important in diet. However the importance is probably not always as high and no other region has been as well documented as the region of the Miombo woodland where wild mushrooms form one of the more important renewable natural resources.

Another important feature is the period of appearance of the carpophores. Fungi start to fruit immediately at the beginning of the rainy season, a period in which food reserves are often exhausted and the newly planted crops are not yet available for harvesting. This is the traditional hunger period (23, 86, 114). Already Livingstone has noted in 1867 the eating of large amounts of mushrooms during this period in the Zambian Northern Province (115): "Famine and famine prices - people live on

mushrooms and leaves. Of mushrooms we observed that they choose five or six kinds and reject ten sorts. ... It is named Motente, another Mofeta ... some experience must have been requisite to enable them to distinguish the good from the noxious". Piearce (115) interpreted the names cited by Livingstone; they refer to *Amanita zambiana*, *Lactarius kabansus* and some *Amanita*, *Lactarius* and *Russula* species.

The work of Thompson (132) demonstrates, for a central part of Zambia, that mushrooms were the second only to edible insects (mostly caterpillars) as the commonest main ingredient of village meals during the period November to January.

3. Importance as to the nutritive content

Few analyses have been made on the contents of the edible African macromycetes. From other continents much more data are known, especially from the economically important mushroom species (e.g. 36).

The most important data of Africa are from Zaire (25, 101, 102), Zambia (111), South Africa (142) and Malawi (7). The average value of dry weight is 13.6% with a maximum of 65% for *Schizophyllum commune* (101). The average ash content is 9.0% (101). The average fibre content is 6.8%. Mushrooms contain between 12 and 31% of protein on a dry weight basis, which is about 1 to 3% of their fresh weight. Even if fungi cannot supply the necessary daily amount of proteins, and can certainly not compete with beans, they have to be considered as an important supplement to proteins and other vital substances (e.g. vitamins) which are partly lacking in the often one-sided diet of local populations. Taking the large amounts of fungi in consideration which are consumed in certain regions at a crucial time of the year (see above), it is obvious that macromycetes play an important rôle in the nutrition of local people.

4. The knowledge by the local populations

In our experience (120), people living in the countryside mostly know their fungi very well. On the other hand, knowledge in the urban areas is extremely poor, leading to a certain mycophobia, especially as it is just in these populations that poisoning occurs more regularly.

Knowledge is transmitted from generation to generation by oral communication. However, as it is always the case, there is some specialization. In most instances it is the elderly women who have the best knowledge. This is, however, dependent on the region (see collecting).
The knowledge for the edible species is very good: testing local people by presenting them mingled up closely resembling *Russula* species proved that

they did not have any problem of correct separation (120). The same has been observed by Morris (88) in Malawi.

It must be noted that, each year, cases of poisoning are reported (e.g. 29), but these are very limited, taking the number and amount of fungi eaten into account. Very often these poisonings occur with people who collect outside their own region of origin.

4.1. Collecting

Depending upon the region, the mushrooms are collected by women or by men. The latter is rather exceptional. We observed it only in tribes living in the rain forest in the Kivu region of Zaire (120). Especially within the Batwa (pygmies), we observed only men collecting which, however, does not exclude collecting by women with whom we never had contact.

The collecting in the Zambesian region has been described in detail for Malawi (88) and corresponds to the observations for Zaire (101) and southern Burundi (Rammeloo, pers. observ.): "The gathering of mushrooms is undertaken almost entirely by women, who usually forage in groups of three or four, often accompanied by young girls and children. Each carries a basket and they may traverse several miles during the course of a day. If mushrooms are plentiful they may forage for only 3-4 hours, always almost in the early morning, for humans have to compete with animal life for the mushrooms concerned" (88).

The same publication mentions that some men, acting as intermittent market traders, specialise in collecting mushrooms for sale, and become knowledgeable about fungi (88). In Nigeria, mushroom hunting is confined to women, though not necessarily as a team work (97).

4.2. Trade

The carpophores are collected either for personal consumption or for sale or both. For trade the mushrooms are brought to the main road where they are displayed for purchase by passers-by or taken into the villages or towns for sale. Some men or women organise trade by buying large quantities at the roadside stalls to carry them to town were the are re-sold at a profit. This kind of organisation occurs in all African countries. It has been described for Nigeria (97), Zaire (23, 25, 100, 131), Zambia (114) and Malawi (86).

As far as we know, the trade of wild mushrooms in Africa south of the Sahara has nowhere been regulated excepted in former Tananarive (Antananarivo, Madagascar). In this city a municipal decree restricted the trade of wild mushrooms to only eleven species (see *Journal officiel de Madagascar* 12-09-1942: 669-670) and obliged traders to prove a basic knowledge of those species to get a special authorization to sell them.

4.3. Vernacular names of edible fungi

From different sources and from own observations in Zaire (120) it is obvious that all species which are regularly consumed or which are poisonous have their proper vernacular name up to the species level. Only exceptionally names embracing several edible species are used, whereas this is custom for those species which have no particular value. It therefore can be considered as an important indication that a mushroom species is edible or toxic when it has a particular name in the local language (85).

In the naming of fungi by native populations some general principles can be found. This aspect will be treated in a separate paper.

5. Collecting in nature

5.1. Local traditions

That a fungus is accepted to be edible forms part of the long-standing traditions of local populations. Often the use of certain fungi for food is associated with other cultural phenomena (97), e.g. belief in god, animals or other mythic phenomena. It is a remarkable fact that for species with a very wide distribution the edibility can be considered different from one area to another. Even within the same country these differences exist. Examples of such differences are documented for Zaire in the notes accompanying herbarium material of Mrs Goossens-Fontana. In Nigeria (97) groups within the same people do not eat certain species whereas others do; this difference is based on mythic beliefs. Other reasons given for not eating mushrooms are the same as in European or western countries, e.g. claiming that they give stomach pains or rheumatism, while others are put off by the fact that fungi are associated with decaying matter, or that carpophores may eventually contain maggots (97). The news about poisonings has created such fear in the minds of some people that they completely avoid mushrooms (97). In our experience, however, (120) the last case is especially true for people living in urban areas.

Several general tendencies can be observed: boletes are nowhere really appreciated. Only Heim (45) indicates that they are regularly consumed in Madagascar. Some *Phlebopus* species seem to be eaten rather regularly too. *Schizophyllum* is consumed in the whole of Africa, but rather exceptionally in Malawi (88). In the rain forest of the Kivu region in Zaire it has seen sold regularly in the local market, but it is certainly not a favourite, and therefore rather low priced (Rammeloo, pers. observ.). In the Zambesian woodlands the most important genera are *Termitomyces*, *Cantharellus* and *Amanita* (Rammeloo, pers. observ. in southern Burundi; 25, 88, 101, 110).

The species of the genus *Agaricus* are very often considered inedible or at least are not collected, whereas the same species are highly esteemed in Europe and America.

Some species which are appreciated nowhere outside Africa are of current use. This difference in appreciation has different origins. In the case of *Schizophyllum* and polypores, the tough consistency is solely a sufficient reason for them not being appreciated in western countries. Other species are considered in Europe of being of no culinary value because they are too small, harvesting being too difficult or time-consuming or that carpophores cook away to quite nothing. In Africa some of these fungi are given especially to young children (88).

Fungi being highly appreciated and highly valued by Africans is demonstrated by the fact that in a part of Brussels, were numerous Africans are living (called the "Matongo Quarter" after a popular district in Kinshasha, Zaire), fungi are imported from Africa and sold fresh or dried, in African food shops.

Fungi are, however, not equally well appreciated by all population groups in Africa. Prof. Van den Berghen (pers. comm.) noted that the people living in the forested regions of Senegal consume fungi in large quantities, whereas people of the savannas did not like them. This distinction between two traditions coincides largely with the religion of the populations, forest people being primarily converted to Catholicism, savanna people being primarily converted to Islam.

While collecting fungi in the Kivu region of Zaire (120), we observed that the Batwa (Pygmies) appreciated and collected many more fungi than the rest of the local population. The Batwa, who tracked the gorillas on the Kahusi volcano, would stop any other activities if they found *Termitomyces microcarpus*, in order to collect this delicacy.

5.2. "New" introductions

Because of the above-mentioned traditions, the introduction of "new" species in the local diet is not that easy.

With the introduction of tree species not native to the African continent a number of ectomycorrhizal associates have been (sometimes intentionally) introduced (e.g. 84). Some of these mycorrhizal fungi produce enormous numbers of carpophores in the exotic forest plantations during the fructification period. One of the most outstanding examples of such a fungus is *Suillus granulatus* (88, 117, 118). In Zambia regular consumers of mushrooms still do not regard it pleasing to the eye and even among forestry workers it is not widely accepted as an edible species (88). In Malawi the same phenomenon has been observed (Rammeloo, pers. observ.). Changes in

traditional food habits are sometimes very difficult to realise, especially in the case of fungi, because unknown species are always regarded with great suspicion. The attempt to propagate the eating of *Suillus granulatus* in Zambia (114) is a good example of it.

According to Mikola (84) the imported mycorrhizal fungi may improve the economy of exotic forest plantations as parasites of certain edible mushrooms have not always been introduced with the hosts. However, it has to be noticed that some extremely poisonous fungi like e.g. *Amanita phalloides* - which were formerly unknown to native populations - have been introduced too.

5.3. Preparation and conservation

The carpophores are prepared in different ways. Eating them raw is rather exceptional. A *Lactarius* species is reported being always eaten raw (110); for *L. kabansus* this is regularly the case (110). Mostly fungi are eaten fresh, being cooked the day of collection (e.g. 97). Some species are always dried in the sun or are smoke-dried before cooking and preparing. In Malawi and Zambia (110) the latter is often the case with *Russula*, *Lactarius* and *Cantharellus* species. In Malawi *Phlebopus* boletes are reported to be prepared that way too (86). They can be kept for a reasonable long period, then being available during the dry season.

In the case of *Lentinus tuberregium*, the sclerotia are kept dry and watered when the need arises (e.g. 97). As a consequence, carpophores developping on the sclerotia can be harvested over a fairly long period. Sometimes the sclerotia are prepared themselves, being milled to powder.

In Nigeria the cap and the stipe of the mushrooms are cut into pieces and suspended for some time in cold salted water to kill maggots which might be present among the gills of the mushroom (97). This operation is not described from other regions, although it is not to exclude that it is a regular practice. Most of the fungi are simply cooked, sometimes with enough salt to flavour them (97), often together with groundnuts, tomatoes, onions, spices and some oil or simply prepared as a soup. In some cases the first boiling water is thrown away, a technique which is also used in Europe for some species, to remove and/or destroy possible poisonous substances.

In different parts of Tanzania a mushroom-stew is prepared by cooking mushrooms in oil or oily seeds (42), together with vegetables.

In Mauritius (106) *Tricholoma mauritiana* and *T. spectabilis* have to be baked (heated) long enough, otherwise intoxications are inevitable; these fungi contain probably cyanic compounds which are destroyed by heating. This phenomenon is known for other species in temperate regions.

A general feature of the preparation of mushrooms which have a very tough consistency (e.g. *Schizophyllum*, *Lentinus*, *Marasmius* spec.) is to boil them in ash water (using ashes from plant material) in order to soften them. This has been reported from all the regions where those tough species are consumed (e.g. 101).

6. Culture of edible fungi

Only a very few species are cultivated with traditional methods: e.g. *Lentinus tuberregium* (93, 99) and *Termitomyces microcarpus* (93). There are few reports of the industrial cultivation of fungi: *Pleurotus ostreatus* (26), *Agaricus subedulis* (19), *Agaricus bisporus* (142, as '*A. brunnescens*') and *Macrolepiota zeyheri* (142). Pilot projects are underway in different countries, especially for the culture of *Pleurotus species* (Burundi, Congo (26), Mauritius, Rwanda, ...). Occasionally other well-known species are cultivated, such as *Volvariella volvacea*, but this is not done on an industrial scale as it is the case in Asia. Recently, researchers attempted a mycelium production of several Zairian, lignicolous edible fungi to select easily adaptable species for carpophore production (93).

It is obvious from the results in other tropical or subtropical countries that many substrates, which presently are considered as waste, are excellent for the cultivation of mushrooms. In several cases these "waste" materials need special treatment. The remains of bean plants have to be carefully dried after harvesting in order to avoid them becoming worthless for *Pleurotus* culture due to the growth of moulds (De Groote, pers. comm.). Another good substrate, for the culture of *Volvariella*, seems to be dried water hyacinth, which is certainly not lacking in certain regions of Africa. In regions of industrial use of oil palm, large amounts of organic material is available, the remains of the "regimes" being too large to be completely used for combustion in order to produce energy and steam necessary in the oil processing. This raw material has already been surface sterilised at which moment it becomes available as a possible culture substrate, which is an enormous advantage. In the Congo Republic a mixture of cassava stalks and lucerne flour is used to cultivate *Pleurotus* (26). It will be necessary in the coming years to invest in research in order to develop the culturing technology to use these different substrates. In Mexico (126) for example *Pleurotus ostreatus* has been cultured on coffee pulp; other species and other substrates are tested.

Part of this research has to be axed on the selection of suitable species or suitable races for culture under local conditions, so that investment will be minimal. Western technology cannot be introduced blindly, as has been proved for the culture of *Agaricus campestris* (18). It must be remarked that *A. campestris* has probably never been grown in culture and that the

indications in the literature are erroneous, the species cultured being *A. hortensis* and *A. bisporus* (Heinemann, pers. comm.).

7. Other uses made of fungi

In Africa south of the Sahara fungi are not only used as food. They play a rôle in traditional medicine (1, 31, 44, 50, 94, 97, 98, 133), in beliefs (44, 94, 97), and are sometimes used as cosmetic (e.g. the use of *Battarea* spores by Topnaar (133) in the Namib desert), as dye (31) or even for fumigation of huts (31). In the Congo the black rhizomorphs of *Marasmius crinisequi* are used to tie jewelry (125).

Fungi seem also to be used for their psychotropic substances. The latter seems to be exceptional or even very exceptional, or at least is not well documented in the literature, possibly because Europeans have no access to this world of local knowledge. One of the few references of such a use comes from Livingstones notes: "Observed at Chibanda's a few green mushrooms which on being peeled chewed a pink fleshy inside. They are called Chisimba and only one or two are put into the mortar in which the woman pound the other kinds to give relish it was said to the mass. Could not ascertain what properties Chisimba had when taken alone. But mushroom diet in our experience is good only for producing dreams of the roast beef of byegone days. The saliva runs from the mouth in these dreams and the pillow is wet with it in the mornings (115)." According to Pearce (115) Chisimba refers most probably to a *Russula* species.

Gartz (34) reported of rock-drawings in the Sahara desert of about 10,000 years old, representing anthrapomorphous figures ecstaticly dancing with psychotropic mushrooms in their hands. This is probably the oldest indication of the use of fungi in Africa! Nevertheless, today, use of psychotropic fungi in Africa seems not to have the same importance as it has in Central and South America and in South East Asia[2].

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[2] see e.g. Singer R. & Smith H. (1958), *Mycologia* **50**: 239-303; Heim R. (1963), Les champignons toxiques et hallucinogènes, Paris, Boubée; Allen J.W. & Merlin M.D. (1992), *J. Ethnopharmacology* **35**: 205-228; etc.

LIST OF SPECIES REPORTED TO BE EDIBLE

Presentation of the data

Nomenclature: all the scientific names used for edible fungi of Africa south of the Sahara which could be traced in the literature are listed. They have been placed in alphabetical order. However, references on edibility information are only enumerated under currently accepted names; synonyms are included with a cross-reference to these accepted names. In most cases the author citations were either lacking or did not follow the rules of botanical nomenclature. Author names have been added here, even when omitted in the original publication.

References: in some cases it has been impossible to trace original publications cited in other references, which is mentionned in the list of references. New data on edible fungi may eventually be found in them. **References are given only to publications in which fungi are cited to be edible**. This means that a certain species can be widespread in Africa but has been cited here only for the countries or regions from which a positive edibility is stated. Consequently, the list does not give the distribution of the species in Africa. The countries are given in alphabetical order.

Comment: in a comment some more detailed information is given. When no comment is made, the species was mentioned in the original publication as edible or consumed, without further precision.

Afroboletus

Afroboletus costatispora: see ***Strobilomyces costatispora***

Afroboletus luteolus (Heinemann) Pegler & Young — Malawi (89).
The species is said to be possibly edible. It is widespread in Malawi. The fact that no local names are recorded seems a good indication that this fungus is certainly not important as a food source. Neither can other boletes of this group (better known under the genus name *Strobilomyces*) be considered as favourite foods. Only *Strobilomyces costatispora* seems to be of some importance as food in Malawi (114, 147).

Agaricus

A very large genus occurring worldwide. Numerous species have wide areas of distribution, which is partly linked with their saprophytic habit. Their determination is rather difficult; a key for the species of the world has been published by Heinemann (64). It is obvious that a number of determinations are based only on macroscopical observations.

The edibility has often been noted for African countries. It is clear however that *Agaricus* species are not the favourites of African populations; they are not used at all or their consumption is very limited (10, 101), whereas for Europeans in Africa they are often the only wild mushrooms which are collected for consumption.
The genus contains only a small number of slightly poisonous to poisonous species, most of them in the section Xanthodermatei.

Agaricus spec. — Tropical Africa (45), East Africa (65), Cameroon (68), Ghana (80), Lesotho (40), Malawi (147), South Africa (76), Tanzania (32), Uganda (91).
Edible species which have not been determined to species level have been noted in several countries; this as a clear illustration of the difficulties often encountered in determining *Agaricus* species. The data of East Africa and Tanzania refer to "*Psalliota kiboga* P. Henn.", the data of Tropical Africa and Cameroon to "*Psalliota microsperma* P. Henn."; two isolated names.

Agaricus africanus (Fay.) Sacc. — Somalia (45).
Is said to be edible without any further precision. Has probably not been found again since the time of its description (Heinemann, pers. comm.)

Agaricus amboensis (Fay.) Sacc. — Somalia (45).
Is said to be edible, without any further precision. Has probably not been found again since the time of its description (Heinemann, pers. comm.)

Agaricus amethystina = ***Agaricus semotus***

Agaricus arvensis Schaeff. — South Africa (38, 76, 78, 128, 135, 141), West Africa (45).
The species is regularly consumed by the indigenous populations of West Africa (45); from South African literature it is not fully clear whether the fungus is consumed by the white or the black population.
In North America varieties are known which can cause illness (6). It can, however, not be excluded that these data are based on wrong determinations: Heinemann (pers. comm.) is rather convinced that these data are based on a confusion with *A. xanthodermus*.

Agaricus augustus Fr. — South Africa (76).
Highly recommended.

Agaricus bingensis Heinemann — Malawi (21, 89), Uganda (91).
In Uganda the species has been noted as a food source amongst the Acholi (91).

Agaricus bisporus (J. Lge.) Imbach — Malawi (21, 147), Mauritius (104), South Africa (38, 104, 142), Zambia (110).
In most instances this species is cultivated. In Malawi it is apparently picked up in nature, being "very popular among the British being the only wild mushroom that most of them dare eat" (147). It is predominantly a crop of the temperate world. Its culture has been tried in Mauritius (104); it is grown with only limited success in

Zambia (110), and has been successfully introduced in various subtropical countries such as South Africa (82). In Malawi the cultivated mushrooms are commonly sold in the shops (21) but it is not clear to us whether cultivation takes place in Malawi or whether the mushrooms are imported (e.g. from South Africa). The species occurs in Zaire (56) where it is not used as a food by local populations. The species is cultivated in South Africa (strain Sinden A6); a chemical analysis of its nutritive compounds is published (142).

Agaricus brunnescens = ***Agaricus bisporus***

Agaricus campestris L.: Fr. s.str. – Zaire (56).
Is often searched for, especially in Europe.

Agaricus campestris L.: Fr. s.l. – Ghana (70), Kenya (111), Malawi (21, 88, 147), Madagascar (30, 45), Somalia (45), South Africa (33, 38, 76, 78, 103, 128, 135, 141), Tanzania (32).
Seems to be widespread and not uncommon in Africa. The carpophores are popular as a food for Europeans in Africa, but are seldom, if ever, eaten by Africans. This is true for all the countries cited, except for Madagascar where the species is consumed by the Tanalas (45). One of the South African publications refers to different varieties (78), which in our opinion are possibly not just varieties: descriptive data are lacking, there can be no certainty about the correct determination. This opinion is confirmed by Pearson (103), stating that "the white, so-called field mushroom of the Cape district" ... "is a composite species which requires special study before it can be determined with any satisfaction."

Agaricus comtulus Fr. – South Africa (76, 141).
Said to be edible.

Agaricus croceolutescens Heinemann & Goossens – Malawi (89).
Is said to be edible in the Mulanje district.

Agaricus endoxanthus Berk. & Br. – Malawi (147).
Said to be eaten but considered as somewhat doubtful.

Agaricus erythrotrichus Heinemann – Zaire (56).
Eaten in the region of Bokuma.

Agaricus goossensiae Heinemann – Ghana (70), Zaire (56).
It is a small species but occurs in large numbers, sufficient to be collected for eating (70). In Zaire it is consumed by the Budjala populations and by Europeans (56).

Agaricus nivescens (Moell.) Moell. – Zaire (56).
Eaten, at least locally, in Africa.

Agaricus nobilis (Pearson) Heinemann – South Africa (128, 141).

Agaricus placomyces Peck — South Africa (76).
Edibility suspect (76). In North America (6) there exists some confusion around this species, probably due to wrong determinations; the species and related forms are therefore considered best to avoid.

Agaricus semotus Fr. — South Africa (141).

Agaricus silvaticus Schaeff.: Fr. — South Africa (38, 76, 141).
Edible; reported tasty but rather tough (76).

Agaricus silvicola (Vitt.) Sacc. — South Africa (38, 76, 128).
Is considered edible and good (76), but apparently the use of the species in Africa is restricted to the white population group.

Agaricus subedulis Heinemann — Central African Republic (19, 52, 55).
The "industrial" cultivation technique has been developed by Cailleux (19). The species was already known by the local population as being edible (19).

Agaricus volvatulus Heinemann & Goossens — Zaire: Shaba (25).

Agrocybe

Agrocybe cylindracea (DC.: Fr.) R. Mre. — South Africa (141).

Agrocybe praecox (Pers.: Fr.) Fay. — South Africa (76, 141).

Agrocybe semiorbicularis (Bull. ex St. Am.) Fay. — South Africa (141).

Agrocybe vervacti (Fr.) Sing. — South Africa (141).

Amanita

Species belonging to this genus are very important because of their edibility. They are collected in huge amounts, especially in the Zambesian region. Among the edible mushrooms of Shaba (Zaire) the representatives of this genus occupy the second place after the *Cantharellus* species (101). In Malawi *A. zambiana* in particular is very important and sold on roadside stalls (86). Several species are not only consumed fresh, but are dried too for later consumption.
The genus is reputed too for its poisonous species. Possibly very few of the indigenous, tropical African species are poisonous but several poisonous species have been introduced with exotic trees like pine and oak.
The most complete treatment of the African species is made by Beeli (12) but needs updating. A critical revision of the species of the Miombo woodland is urgently needed; from the literature it is obvious that much misunderstanding or wrong determinations are frequent (e.g. concerning *A. bingensis*).

Fig. 1. *Amanita rhodophylla* Beeli (x ½)
[redrawn from Beeli (12)]

Amanita spec. – Malawi (86), Tanzania (42), Zaire: Shaba (101).

Amanita aff. ***aurea*** (Beeli) Gilbert – Zaire (25, 101).

Amanita bingensis (Beeli) Gilbert – Malawi (88, 89).
Is a common species of the Miombo woodland. 'Highly poisonous' according to Heim (*Rev. Mycol.* 5: 28) but as suggested by Morris (88) there appears to be a number of yellow *Amanita* species in central Africa that are considered edible (89).

Amanita aff. ***calopus*** (Beeli) Gilbert – Malawi (89).
Considered edible.

Amanita flammeola Pegler & Piearce – Zambia (110), possibly Malawi (89).
Occurs in the Miombo woodland. Normally only the caps are sold, occasionally part of the stipe is included in young specimens (110). It has a soft texture, a pleasant odour an a mild taste. It is never available in great quantities in the markets.

Amanita fulva (Schaeff.) Fr. – Malawi (147).
Edible and good; found in the woodlands of the northern region of Malawi.

Amanita goossensiae Beeli – Malawi (89), Zaire (25).
Said to be eaten (25); in Malawi yet seems not to be a favourite species, only being indicated by "used" in Williamson's note-books (89).

Amanita hemibapha (Berk. & Br.) Sacc. – Malawi (88, 89, 147).
Used all over Malawi, cooked either fresh or dried and well-liked. A number of subspecies, all edible, are based mainly on the colours of the cap; subsp. *hemibapha*

is crimson red, subsp. *javanica* is orange to yellow ochre, subsp. *similis* is sooty brown to olivaceous brown (147).

Amanita hovae Bouriquet — Madagascar (16).
Probably edible (16).

Amanita loosii Beeli — Zaire: Shaba (25, 101).

Amanita rhodophylla Beeli — Malawi (89, 147) — Fig. 1.
A highly prized, very popular fungus. It is important to note that this species macroscopically strongly resembles the very poisonous species *A. phalloides*.

Amanita cf. ***robusta*** Beeli Malawi (147), Zaire: Shaba region (25, 101).
The mushrooms are blanched in boiling water while the caps are still closed, and then the caps may be peeled; they are cut in pieces, sauteed in oil together with thinly sliced onions and seasoned with salt and chilies (101). The fungus is said having a strong fishy "green" taste when boiled; the cooking liquid is yellow; when sauteed it has a very strong flavour and leaves a bitter taste in the mouth (147).

Amanita rubescens (Pers.: Fr.) S.F. Gray Malawi (89), South Africa (38, 76, 128, 135, 141).
The species is found under pine and oak trees in South Africa (135). We have no indications as to ecology of the findings in Malawi; it is plausible that the species has been introduced from Europe as a mycorrhizal associate of imported trees. Is indicated as being poisonous when raw, edible when cooked (76, 89). Eating this species needs a warning because of its possible confusion with the poisonous *Amanita pantherina* (135).

Amanita solitaria (Bull.: Fr.) Mér. — South Africa (38, 141).

Amanita strobiliformis (Paul.: Vitt.) Bertil. South Africa (76, 135).
Edible, but the sickly-sweet odour makes it unattractive for most people; the odour is not always equally strong (135). Pungency persists even when cooked (76). From the European literature it is clear that there exists a lot of taxonomic confusion (Bas, pers. comm.).

Amanita vaginata (Bull.: Fr.) Vitt. — Malawi (21, 147).
A well-liked species because of its softness; usually not dried (147). The description by Chipompha (21) is certainly not typical of this species.

Amanita zambiana Pegler & Piearce Malawi (88, 89), Zaire (25), Zambia (110).
Only the caps are marketed; sometimes dried for storage, but always first boiled and drained off before drying (110).

Amanitopsis = *Amanita*

Annelaria

Annelaria semiovata (Sow.: Fr.) Pearson & Dennis f. ***exannulata*** Pearson – South Africa (141).

Armillaria

The species are saprophytic or parasitic (weakness parasites). Recent studies (e.g. *Karstenia* **18**: 31-43) have demonstrated the complexity of several species. The names used here have to be considered as species names in their wide sense.

Armillaria distans Pat. – Congo (27, 45).
Eaten by the local population.

Armillaria mellea (Vahl: Fr.) Kumm. – Tropics (149), Nigeria (151), South Africa (38, 76, 141, 149).
The appreciation of this mushroom strongly differs. It is said to be edible when cooked, with a good "mushroomy" flavour (76); the unpleasant taste disappears in cooking and the mushroom is widely used as food (151).
In North America it is one of the most commonly eaten species (6), just as it is the case in some European countries. It has, however, sometimes caused gastrointestinal upset, which may be the result of improperly cooking or eating raw carpophores; it is likely that certain individuals cannot tolerate this species, especially when it is eaten in large quantities (6).

Armillaria polymyces (Pers. em. Sing. & Clém.) Heerink – South Africa (76).

Armillariella = *Armillaria*

Aureoboletus

Aureoboletus cramesinus = ***Aureoboletus gentilis***

Aureoboletus gentilis (Quél.) Pouzar – South Africa (141).

Auricularia

The genus is widespread. Most species have a pantropical distribution. It is largely used in Asian cooking. In Asia industrial culture techniques are developed for some species. The group has never been studied in detail for Africa, and most of the literature data given here, are probably based on macroscopical resemblances. Before developing techniques for the cultivation of these fungi in Africa a taxonomic screening of the African material could be very useful.

Auricularia spec. – Tropics (149), East Africa (65), Central African Republic (50), Gabon (140), Nigeria (151), Tanzania (42).

Auricularia auriculajudae (Bull.: Fr.) Wettst. — East Africa (65), Malawi (88, 89, 147), Nigeria (151), South Africa (38, 76), Zaire (37).
Is cooked with plenty of groundnuts and well-liked especially by old women; also dried for later use (147). Part of the records for Malawi possibly refer to *Auricularia delicata*.

Auricularia delicata (Fr.) P. Henn. — Malawi (89), Zaire (93).
Part of the references made for *Auricularia auriculajudae* probably refer to this species (89). In Zaire dried carpophores are sold at markets almost permanently (93).

Auricularia polytricha Mont. — Tanzania (32), Zaire (37).

Auricularia tenuis Lev. — Zaire (25, 93).

Bolbitius

Bolbitius vitellinus (Pers.: Fr.) Fr. — Malawi (89).
Reported to be edible but considered not worth trying.

Boletus s.l.

Boletes are certainly not the favourites of African populations. If boletes are collected for consumption it is done only as a last resort. Madagascar makes an exception to this general pattern (45) as well as the consumption of some *Phlebopus* species.
According to Parent & Thoen (101) it is possible that a taboo exists on the consumption of boletes, the flesh often changing from colour on exposure to the air, due to oxidases.
In South Africa boletes are regularly collected and eaten by the white population. The boletes consumed in this country generally are well-known European species. These species are collected in forests of exotic trees. As most boletes are mycorrhizal, they have been introduced together with their host trees.
(see also: *Afroboletus, Aureoboletus, Chalciporus, Leccinum, Phlebopus, Pulveroboletus, Rubinoboletus, Strobilomyces, Suillus, Tubosaeta, Xerocomus*)

Boletus s.l. div. spec. — Malawi (86).
Are often dried before eating; on the whole they tend to be less palatable or need a more elaborate cooking; gathered when the needs arises (86).

Boletus badius = ***Xerocomus badius***
Boletus bellini = ***Suillus bellinii***
Boletus bovinus = ***Suillus bovinus***
Boletus chrysenteron = ***Xerocomus chrysenteron***
Boletus cramesinus = ***Pulveroboletus cramesinus***
Boletus duriusculus = ***Leccinum duriusculum***

Boletus edulis Bull : Fr. — South Africa (29, 38, 76, 135, 141).
Edible and excellent. The name *B. edulis* is used in the South African literature for different species (135), not even belonging to the complex of *B. edulis*. Judging from illustrations, the species itself is encountered in that country.
Marloth (82) notes that the fungus attains much larger dimensions than in Europe, weighing not rarely 2, and occasionally 3 pounds (1360 g), the cap being 8 or 10 or even 12 inches (30.5 cm) in diameter. Rammeloo (pers. observ.) observed a similar phenomenon with carpophores of *Amanita muscaria* in planted pine forests of Malawi.

Boletus pinicola Vitt. — South Africa (141).

Boletus piperatus = ***Chalciporus piperatus***
Boletus sudanicus = ***Phlebopus sudanicus***
Boletus sulphureus = probably ***Pulveroboletus hemichrysus***

Bondarzewia

Bondarzewia berkeleyii (Fr.) Bond. & Sing. — Zaire (28).

Calocybe

Calocybe gambosa (Fr.: Fr.) Donk — South Africa (38).

Calvatia

Calvatia cyathiformis (Bosc) Morg. — Nigeria (94, 97, 151).
Edible, but has to be eaten while the flesh is white (151).

Calvatia excipuliformis (Scop.: Pers.) Perdeck — South Africa (38).

Calvatia utriformis (Bull.: Pers.) Jaap — Malawi (89), South Africa (38).
In Malawi considered edible in the Zomba district (89).

Camarophyllus

Camarophyllus subpratensis (Beeli) Heinemann — Zaire (58).

Cantharellus

In the Zambesian region the *Cantharellus* species are very popular and occupy the first place regarding the quantity harvested. In other regions the members of the genus are eaten as well, but they do not occur in such large quantities and are therefore less important. During the rainy season they are an important subject of trade, being sold on market stalls in small piles or measures. Different species are mixed together. The economically most important species are *C. cibarius, C. congolensis, C. longisporus* and *C.*

symoensii. They are used fresh or dried. *Cantharellus* species are highly esteemed, by both Europeans and native populations.
(see also: *Craterellus, Goossensia, Pseudocraterellus*)

Cantharellus spec. — Tanzania (42), Zaire (93).

Cantharellus spec. ? — Gabon (140).
A small yellow infundibuliform fungus collected in the savanna, eaten by local populations as well as by Europeans, could be a *Cantharellus* species.

Cantharellus aurantiacus var. *congolensis* = ***Cantharellus pseudofriesii***

Cantharellus cibarius Fr.: Fr. var. ***cibarius*** — Malawi (88, 89, 147), Zaire (25, 57), Zambia (110).
Extremely common in Miombo woodland and in secondary vegetations with *Uapaca kirkiana*, but is also found in the rain forest. Is universally estimated and eaten. Is rather tough and should be cooked slowly (147). Chemical analysis of the African material has been published (25).

Cantharellus cibarius var. ***defibulatus*** Heinemann — Zaire: Shaba (25).
With the same edibility as the var. *cibarius*.

Cantharellus cibarius var. ***latifolius*** Heinemann — Zaire: Shaba (25, 101).
With the same edibility as the var. *cibarius*.

Cantharellus congolensis Beeli — Malawi (88, 89, 147), Zaire (25, 57, 101).
A well-liked species occurring in woodland with *Brachystegia* and *Uapaca*; is less common than *C. cibarius* but is often gathered together with it (88, 89, 147). A chemical analysis of African material has been published (25).
The "*Lentinus favoloides*" consumed by the pygmies of the Bébé savanna in the Central African Republic (51) possibly also refers to this species.

Cantharellus cyanoxanthus Heim — Zaire (57).
Edible; not eaten by the populations in the neighbourhood of Binga (Zaire).

Cantharellus densifolius Heinemann — Malawi (88), Zambia (110).
Is found in small groups in the Miombo woodland and in plantations of *Pinus khasya* and *Eucalyptus grandis* (110).

Cantharellus incarnatus (Beeli) Heinemann — Zaire: Shaba (57).
Sold in the markets of Lubumbashi (Zaire); not eaten in other regions (Binga, Zaire).

Cantharellus longisporus Heinemann — Malawi (88, 147), Zambia (110).
Is one of the commoner attractive species, especially occurring in Miombo woodland with *Brachystegia* and *Uapaca*. Sold in markets, often together with other *Cantharellus* species. More common towards the end of the rainy season.

Cantharellus luteopunctatus (Beeli) Heinemann — Zaire: Shaba (25, 101).

Cantharellus miniatescens Heinemann – Zaire (25, 57), Zambia (110).
Is a one of the commonest edible fungi occurring during the entire rainy season though being more abundant at the end of it (110); it is strongly "perfumed" (57); it can be sun dried and sold during the dry season (110). A chemical analysis has been published (25).

Cantharellus platyphyllus Heinemann – Zaire: Shaba (25, 101).

Cantharellus pseudocibarius P. Henn. – Cameroon (69), Zambia (110).
Has a strong apricot odour and a mild taste (110). Occurs in the Miombo woodland.

Cantharellus pseudofriesii Heinemann – Zaire (10).

Cantharellus cf. ***ruber*** Heinemann – Zaire: Shaba (25, 101).

Cantharellus rufopunctatus (Beeli) Heinemann – Zaire (9, 57) - Fig. 2.
Has a delicate taste. Its edibility has been noted in the Djongo region (Bwakas) and in the Binga region.

Fig. 2. *Cantharellus rufopunctatus* (Beeli) Heinemann (x ½)
[redrawn from Heinemann (57)]

Cantharellus symoensii Heinemann – Zaire: Shaba (25).

Cantharellus tenuis Heinemann – Malawi (88, 89, 147).
Occurring in the *Brachystegia* woodland, often in large numbers. Cooked with groundnuts, tomatoes and onions it is said to be very tasty.

Chalciporus

Chalciporus piperatus (Bull.: Fr.) Bat. — South Africa (141).

Edible. For Europeans it is somewhat astonishing that this species is said to be eaten because of its taste.

Chlorophyllum

Chlorophyllum madagascariense (Dufour) Heinemann — Madagascar (30).

Chlorophyllum molybdites (Meyer: Fr.) Massee — Tropical Africa (45), Congo (45), Nigeria (151), West Africa (45), Zaire (59, 60), Madagascar (45, 47).

This species is normally poisonous. Although there exists data in the literature that the species is edible, it is wise not to experiment with its consumption. The supposed edibility is probably based on wrong determinations; edible *Macrolepiota* species have been taken for *Chlorophyllum molybdites*. Furthermore it has been proved that there exists a personal degree of reaction, some people not undergoing any disturbance, where others are severely sick. From the study of the material from Zaire (60) it is clear that there are at least five or six different taxa which up to now have all have been named *Chlorophyllum molybdites*.

In the case of the Nigerian data the author explains that there are two types of fruit bodies in the basket with carpophores he bought as being edible. The supposed edibility was based on the declaration of the woman who collected them. The carpophores have been thrown away by the author, without any experimentation about edibility.

In the data from West Africa it is said that the species takes place of the *Macrolepiota procera* in Europe. It is highly regarded by the Bambaras which indicate (after Curasson, cited in 45) that it has the same alimentary value as chicken meat. In Madagascar it is consumed (47), being compared to wild chicken (45).

In North America, especially in the south, the species has caused numerous cases of poisoning (6). It has however also be shown (6) that some people can eat the species without ill effects. Nevertheless the species should be considered poisonous. Within the different types of poisoning this species is classified with the gastrointestinal irritants.

Clavaria

The central African species of *Clavaria* and allied genera have been treated by Corner and Heinemann (22). At that time they did not have specific data on the edibility of this group, but considered most species of clavaroid fungi edible, excepted for some *Ramaria* species which show clearly purgative effects.

Clavaria cf. ***albiramea*** Corner — Malawi (86, 88, 89, 147), Zaire: Shaba (25).

Is certainly not a favourite species as it is collected only as a last resort (86). The species is said to be rather tough and fleshy (86). Is cooked, used fresh or dried (88, 89, 147).

Clavulina

Clavulina cinerea (Bull.: Fr.) Schroet. — South Africa (38).

Clavulina coralloides (L.: Fr.) Schroet. — South Africa (38, 76).
Edible when young (76).

Clavulina cristata = ***Clavulina coralloides***

Clitocybe

Clitocybe gibba (Pers.: Fr.) Kumm. — South Africa (38).

Clitocybe infundibuliformis = ***Clitocybe gibba***

Clitopilus

Clitopilus prunulus (Scop.: Fr.) Kumm. — South Africa (38).

Collybia

Collybia spec. — Ghana (23).

Collybia acervata (Fr.: Fr.) Kumm. — South Africa (141).

Collybia anombe De Seynes (nomen dubium) — Congo (27).
Well-liked by the indigenous populations.

Collybia butyracea (Bull.: Fr.) Kumm. — South Africa (141).

Collybia confluens (Pers.: Fr.) Kumm. — Malawi (88), South Africa (141).
Said to be edible but not recommended (88). Pegler (109) suggests that the species is associated with plantation crops and therefore likely to be introduced in East Africa. As the species occurs in Malawi in degenerate *Brachystegia* woodland and in evergreen forests its status is questioned (88).

Collybia dryophila (Bull.: Fr.) Kumm. — Malawi (88, 89).
Edible. Pegler (109) suggests that the species is introduced in East Africa.
This species is very widely distributed and variable. In North America it is not excluded that some races or forms should be poisonous (6). A critical study is required before the edibility of the group can be accurately determined (6).

Collybia fusipes (Bull.: Fr.) Quél. — South Africa (76).
Not edible because of its toughness, but very young caps may be eaten; taste indifferent (76).
In Belgium once a family showed some signs of illness: this was probably due to the large quantities consumed rather than to the toxic character of the species (Rammeloo, pers. observ.).

Collybia oronga De Seynes (nomen dubium) — Congo (27).
Well-liked by the indigenous populations.

Collybia piperata (Beeli) Sing. — Zaire (9).

Collybia tamatavae Bouriquet — Madagascar (16).
Commonly sold at markets in Tamatava.

Cookeina

Cookeina spec. — Tropics (149).
Some species are reported edible.

Cookeina sulcipes (Berk.) O. Kuntze — Zaire (75).
Eaten in the Budjala region.

Coprinus

The genus has a cosmopolitan distribution. Most species are not worth being picked as food, being too small and disintegrating too quickly. A few species are reputed to give intoxication if used with alcohol. In temperate regions research is done to develop culture techniques and to select races which can be grown and commercialised. Such research is also known from Ghana (80).

Coprinus sp. — Ghana (80), West Africa (45).
In Burkina Faso (45), a *Coprinus* species growing on ruderalised localities grazed by cattle is strongly appreciated by the local population (45).

Coprinus agricola Pearson — South Africa (141).

Coprinus atramentarius (Bull.: Fr.) Fr. South Africa (38, 76, 141).
Has to be used with care (38), and not be consumed with alcohol (76).

Coprinus cinnamomeus Fr. — South Africa (141).

Coprinus comatus (Müll.: Fr.) Pers. South Africa (38, 76, 88, 128, 135, 141).
Edible with a delicate flavour (76) if eaten before deliquescence starts (135). Cooks away to almost nothing (88).

Coprinus comatus var. *ovatus* = ***Coprinus comatus***

Coprinus disseminatus (Pers.: Fr.) S.F. Gray Malawi (89), South Africa (141), Zaire (10).
Cooks away to almost nothing (89).

Coprinus lagopus (Fr.: Fr.) Fr. — South Africa (76).
Edible but so small and delicate that large quantities are needed to make gathering worthwhile for the pot (76).

Coprinus macrorhizus (Pers.) Rea — South Africa (141).

Coprinus micaceus (Bull.: Fr.) Fr. — South Africa (38, 76, 135, 141).
Edible and tasty, even though small and thin-fleshed (76); rather tasteless (135).

Coprinus micaceus var. *truncorum* = ***Coprinus truncorum***

Coprinus plicatilis (Curt.: Fr.) Fr. — South Africa (76, 141).
Edible but too small to be worth the trouble of preparation (76).

Coprinus truncorum (Scop.) Fr. — South Africa (141).

Cortinarius

Cortinarius multiformis (Fr.) Fr. — South Africa.

Cotylidia

Cotylidia cf. ***aurantiaca*** (Pers.) Welden — Zaire: Shaba (25).

Craterellus

Craterellus aureus Berk. & Curt. — Zaire (57).
Not eaten in the Binga region (57).

Craterellus cornucopioides (L.) Pers. var. ***parvisporus*** Heinemann — Zaire (57).
Eaten by the local population (Diobo-Akula).

Creolophus

Creolophus spec. — South Africa (76).
Is said edible but best avoided unless specimens have been positively identified (76).

Crepidotus

Crepidotus mollis (Schaeff.: Fr.) Staude var. ***calolepis*** (Fr.) Pil. — South Africa (141).

Cymatoderma

Cymatoderma dendriticum (Pers.) Reid — Malawi (86, 88, 89).
Is sold on roadside stalls and is well-liked (88); another opinion says that the species is gathered only as a last resort and that it is rather tough and fleshy (86).

Cymatoderma elegans Jung ssp. ***infundibuliforme*** Boidin — Zaire: Shaba (25).
A chemical analysis is provided (25).

Dictyophora = ***Phallus***

Entoloma

Entoloma argyropus Alb. & Schw. — Tanzania (32).

Entoloma sericeum (Bull.) Quél. — South Africa (141).

Favolus

Favolus brasiliensis (Fr.: Fr.) Fr. — Malawi (88).
Said to be eaten mixed with other mushrooms (88).

Flammula

Flammula carbonaria = ***Pholiota carbonaria***
Flammula gummosa = ***Pholiota gummosa***

Flammula tenera (Schaeff.: Fr.) Quel. (nomen dubium) — South Africa (141).

Flammulina

Flammulina velutipes (Curt.: Fr.) P. Karst. — South Africa (38).

Galactinia

Galactinia vesiculosa = ***Peziza vesiculosa***

Goossensia

Goossensia cibarioides Heinemann — Zaire (57).
Edible, consumed by the populations of Bnaka and Diobo. According to Heinemann (pers. comm.) the status of this genus of the Cantharellaceae is critical.

Gymnopilus

Gymnopilus spec. — Zaire (93).

Gyroporus

Gyroporus castaneus (Bull.: Fr.) Quél. — Malawi (88).
Noted as being edible at Zomba, but not well-known in Malawi (88).

Gyroporus luteopurpureus = ***Rubinoboletus luteopurpureus***

Helvella

Helvella crispa (Scop.: Fr.) Fr. — South Africa (141).
Said to be edible but considered by Dr. Talbot as being toxic (141).

Helvella lacunosa Afzelius: Fr. — South Africa (38, 76).
Edible when young (76), to be used with precaution (38). The carpophores should not be eaten raw, but well-cooked.

Helvella mitra = ***Helvella crispa***

Hericium

Hericium coralloides (Scop.: Fr.) S.F. Gray — South Africa (38).
Some precaution is necessary (38).

Hirneola = *Auricularia*

Hygrocybe

Nearly all species occurring in the tropics are considered edible (149).

Hygrocybe coccinea (Schaeff.: Fr.) Kumm. — South Africa (38).

Hygrocybe conica (Schaeff.: Fr.) Kumm. — South Africa (141).

Hygrocybe firma (Berk. & Br.) Sing. — Tropics (149).

Hygrocybe nigrescens (Quél.) Kühner — South Africa (76).

Hygrocybe nivea = ***Hygrocybe virginea***

Hygrocybe virginea (Wulf.: Fr.) Orton & Watling — South Africa (38).

Hygrophoropsis

Hygrophoropsis mangenotii Locq. — Ivory Coast (77)
Regularly consumed by native and European populations. According to Heinemann (*Bull. Jard. Bot. Nat. Belg.* **33**: 415) it is more probable to be a *Camarophyllus* species.

Hygrophorus

Hygrophorus conicus = ***Hygrocybe conica***

Hypholoma

Hypholoma candolleanum = ***Psathyrella candolleana***
Hypholoma velutinum = ***Lacrymaria lacrymabunda***

Hypholoma wambensis Beeli — Zaire (10).

Inocybe

Inocybe spec. — Malawi (89).
Is a well-known mushroom in the Zomba district; its reputed edibility is clearly of interest as the majority of the European members of the genus are poisonous, some of them fatally so (89).

Kuehneromyces

Kuehneromyces mutabilis (Schaeff.: Fr.) Sing. & Smith — Tanzania (32).

Laccaria

Laccaria laccata (Scop.: Fr.) Berk. & Br. — South Africa (38, 76, 141).

Laccaria edulis Bouriquet — Madagascar (16).

Lacrymaria

Lacrymaria lacrymabunda (Bull.: Fr.) Pat. — South Africa (141).

Lactarius

Lactarius species are very common in certain vegetation types, e.g. the Miombo woodland. The knowledge of the African species is very poor. The central African and Madagascan species have been treated by Heim (48); updating is, however, needed. Some species can be considered as favourite foods, being consumed in very large quantities, whereas others are collected only when the need for food is urgent. Several species are always first boiled and then sun-dried.

Lactarius spec. — Tanzania (42).

Lactarius angustus Heim & Goossens — Zaire (25).

Lactarius craterelloides Heim & Goossens — Zaire: Shaba (25).

Lactarius deliciosus (L.: Fr.) S.F. Gray — South Africa (38, 76, 128, 135, 141).

Edible and tasty when fresh, but may be tough and tasteless in dry weather (135).

Lactarius gymnocarpus Heim — Malawi (88), Zambia (110).

In Malawi it is dried in the sun for several days; on preparing the first boiling water is thrown away; it is certainly not a popular fungus: in the Zomba district only few women consider it worth of collecting because of its unpleasant taste; it is only prepared on shortage; it was not noted on sale (88).

Lactarius hispidulus Heim — Zaire: Shaba (25).

Lactarius cf. ***inversus*** Goossens & Heim — Zaire: Shaba (25, 101).

Lactarius kabansus Pegler & Piearce — Zambia (110).

Is extremely popular in the markets owing to both its abundance and early appearance. Is one of the few Zambian mushrooms regularly eaten in the raw state, although the texture remains firm when cooked, with a mild taste and odour (110).

Lactarius cf. ***latifolius*** Goossens & Heim — Zaire: Shaba (25, 101).

Lactarius (Lactariopsis) pandani = ***Lactarius pelliculatus***

Lactarius pelliculatus (Beeli) Buyck f. ***pallidus*** Heim — Zaire: Shaba (25).

Fig. 3. *Lactarius pelliculatus* (Beeli) Buyck (x ½)
[redrawn from Heim (48)]

Lactarius piperatus (L.: Fr.) Pers. — Malawi (88), South Africa (141), Zambia (110).
In Zambia this species forms an important constituent of "busefwe" (110). Has first to be cooked and rinsed to remove the unpleasant taste (88). Cooking seems also to be necessary to remove some toxic principles (6).

Lactarius sesemotani (Beeli) Buyck — Zaire (9).

Lactarius vellereus (Fr.: Fr.) Fr. — Malawi (88, 147).
Although it tastes very acrid and smells peppery and has sometimes been considered inedible or even poisonous, it is edible if first boiled and rinsed to remove the unpleasant taste (88).

Laetiporus

Laetiporus sulphureus (Bull.: Fr.) Murr. — South Africa (38, 76, 128, 135, 141).
Is edible when still young and brightly coloured, tasting like chicken-breast (135).

Langermannia

Langermannia gigantea (Batsch: Pers.) Rostk. — South Africa (38).
Edible, with some precautions.

Leccinum

Leccinum duriusculum (Schulz. in Fr.) Sing. — South Africa (38, 76, 128, 141).
Edible. Occurring under *Populus canescens* (128); very tasty (76).

Lentinus

Is a very widespread genus mainly in the tropics. The carpophores have to be picked when young, otherwise they are too tough and a very elaborate cooking is necessary. Some species are gathered only when need arises.

Lentinus araucaria Har. & Pat. — Central African Republic (51).
Consumed by the Lissongos and the pygmies (51).

Lentinus bouaya = ***Lentinus brunneofloccosus***

Lentinus brunneofloccosus Pegler — Central African Republic (51).
Consumed by the Babingas pygmies and by different pygmy tribes in the savannas of the Central African Republic (51).

Lentinus cladopus Lév. — Malawi (88, 147), Zambia (114).
Is regularly gathered as food in Malawi, although rarely seen on market stalls and not popular as are the fleshy mushrooms such as *Cantharellus* and *Amanita* species (88); the carpophores are picked when young, being fairly soft at that time, because even

after long cooking they need to be well chewed (147). It is not clear if the carpophores are eaten in Zambia, but the species is at least indicated as being edible (114).

Lentinus favoloides = ***Cantharellus congolensis*** according to Pegler (*Kew Bull. Add. Ser.* **10**: 234).

Lentinus sajorcaju (Fr.: Fr.) Fr. — Tropical Africa (65), Tanzania (32), Zaire (28, 108).

Lentinus goossensiae = ***Pleurotus djamor***
Lentinus rufopunctatus = ***Cantharellus rufopunctatus***

Lentinus squarrosulus Mont. — Tropics (149), West Africa (88), Malawi (88, 147), Nigeria (4, 94, 97, 151), Zaire (93, 108).
Edible but tough (149, 151), used in soups in West Africa (88, 149). Although its toughness, it is one of the fungi commonly collected in the field in Nigeria (4) where the developing basidiocarps are prepared as soup (151); commonly used and well-liked as Ndiwo in Malawi, in spite of its rather tough texture (88); to be picked when fairly soft but even after long cooking need to be well chewed (147).

Lentinus thanginiae = ***Lentinus sajorcaju***

Lentinus tuberregium (Fr.: Fr.) Fr. — Tropical Africa (65), Gabon (140), Madagascar (44), Nigeria (94, 97, 99, 151), Tanzania (32), Zaire (37, 92, 93, 108).
Characterised by the development of a large sclerotium. The use of the carpophores and the sclerotia can be different. In Nigeria the sclerotia are kept dry at home and watered to initiate carpophore development when the need arises (97); furthermore they boiled, scraped into powder and added to soups. The last mentioned use is also known from Madagascar (97) and Zaire (92, 93). The sclerotium is especially used in traditional medicine (44, 99). Chemical analyses are provided (151). It is not absolutely clear whether the data from Gabon really relate to this species (140); it is possible that they relate to a polypore.

Lenzites

Lenzites betulina (L.: Fr.) Fr. — South Africa (76).
Young specimens are, apparently, good when eaten raw; with a nutty flavour (76).

Lenzites elegans (Fr.) Pat. — Tanzania (32).
Eaten when young.

Lepiota

Lepiota spec. — Madagascar (47).
After Heim (47), a coprophilous agaric with a reddening chair and eaten by the indigenous populations could be a *Lepiota* (*Macrolepiota*?) spec.

Lepiota canescens Pearson — South Africa (141).
Is possibly *Leucocoprinus discoideus* Heinemann. Edible.

Lepiota congolensis = ***Termitomyces letestui***

Lepiota discipes P. Henn. — Cameroon (69).

Lepiota discoidea = ***Leucocoprinus discoideus***
Lepiota dolichaula = ***Macrolepiota dolichaula***
Lepiota excoriata = ***Macrolepiota excoriata***
Lepiota guttata = ***Limacella guttata***

Lepiota henningsii Sacc. & Sydow — Zaire (28).

Lepiota illinita = ***Limacella illinita***
Lepiota letestui = ***Termitomyces letestui***
Lepiota leucothites = ***Leucoagaricus leucothites***
Lepiota madagascariensis = ***Chlorophyllum madagascariense***

Lepiota madirokelensis Bouriquet — Madagascar (16).
Strongly resembles *Chlorophyllym molybdites*.

Lepiota missionis = ***Leucoagaricus leucothites***
Lepiota molybdites = ***Chlorophyllum molybdites***
Lepiota naucina = ***Leucoagaricus leucothites***

Lepiota praeclara Pearson — South Africa (76, 141).
Is possibly an *Amanita* species, judging from its spore characteristics (76, 103).

Lepiota procera = ***Macrolepiota procera***
Lepiota rhacodes = ***Macrolepiota rhacodes***

Lepiota roseolescens Pearson & Stephens — South Africa (141).

Lepiota zeyheri = ***Macrolepiota zeyheri***

Lepista

Lepista caffrorum (Kalchbr. & Mc Owan) Sing. — Malawi (89), South Africa (53, 89, 104, 141).
A well-known edible species (104), cited by Heim as being the basis of an important trade (53). There are no records of being gathered as food in Malawi (89). In South Africa it is considered to be one of the most important edible mushrooms (89); it has been eaten without ill-effects, but it has also proved to be toxic, the symptoms being headache, giddiness and colic (141). It is not clear whether these different reactions are due to a personal sensitiveness or based on wrong determinations.

Lepista luscina (Fr.: Fr.) Sing. — South Africa (141).

Lepista nuda (Bull.: Fr.) Cke. — South Africa (38, 141).
Edible, but with some precautions (38).

Lepista personata (Fr.: Fr.) Cke. — South Africa (38, 141).

Lepista saeva = ***Lepista personata***

Leucoagaricus

Leucoagaricus bisporus Heinemann — Zaire (62).
Eaten in Tongoni (mentioned as former Vieux-Kasongo), not consumed at Kinshasa.

Leucoagaricus cretatus = ***Leucocoprinus cretatus***

Leucoagaricus leucothites (Vitt.) Wasser — South Africa (38, 103, 135, 141), Zanzibar (65).
Edible (38, 141) and common (103).

Leucoagaricus naucinus = ***Leucoagaricus leucothites***

Leucocoprinus

Leucocoprinus africanus = ***Macrolepiota africana***

Leucocoprinus cretatus Locq. — South Africa (76).
Edible and good with a delicate flavour.

Leucocoprinus discoideus (Beeli) Heinemann — Zaire (13).

Leucocoprinus gandour Har. & Pat. — Congo (41).
Is probably a *Macrolepiota* spec.

Leucocoprinus imerinensis Bouriquet — Madagascar (15).
Is probably a *Macrolepiota* spec.

Leucocoprinus molybdites = ***Chlorophyllum molybdites***

Leucocoprinus tanetensis Bouriquet — Madagascar (16).
According Bouriquet (16) it is one of the best edible fungi occuring in Madagascar.
Is probably a *Macrolepiota* spec.

Limacella

Limacella guttata (Pers.: Fr.) Konrad & Maublanc — South Africa (76, 141).

Limacella illinita (Fr.: Fr.) Murrill — South Africa (141).

Lycoperdon

Lycoperdon hyemale = ***Vascellum pratense***

Lycoperdon perlatum Pers.: Pers. — South Africa (38).

Lyophyllum

Lyophyllum decastes (Fr.: Fr.) Sing. — South Africa (76).

Macrolepiota

Macrolepiota africana (Heim) Heinemann — Central African Republic (52), Zaire (61).

Considered as an excellent edible mushroom.

Macrolepiota dolichaula (Berk. & Br.) Pegler & Rayner — Kenya (111), Malawi (21, 88), Nigeria (151).

Is often confused with other *Macrolepiota* species and with the poisonous *Chlorophyllum molybdites* (111, 151). In Kenya used by several indigenous tribes and by some Europeans (111). In Malawi not well-known (88), although sometimes said to be common (21) and appearing to be rarely used as food (88); the only two records from this country are doubtful (88).

Macrolepiota excoriata (Schaeff.: Fr.) Wasser — South Africa (38).

Macrolepiota excoriata var. ***rubescens*** Dufour — Madagascar (30).

Macrolepiota gracilenta (Krbh.) Wasser var. ***goossensiae*** (Beeli) Heinemann — Zaire (25, 61).

Macrolepiota praeclara = ***Lepiota praeclara***

Macrolepiota procera (Scop.: Fr.) Sing. — Angola (141), Ghana (13), Malawi (21), South Africa (38, 76, 141), Tanzania (32), Zaire (11, 13, 25, 61), Zambia (110).

Is is not to be excluded that some of these determinations can be erroneously mistaken for *M. zeyheri* and other related species, especially as most of the determinations are based on the macroscopical aspect. In Angola the carpophores are dried for use in time of food shortage (141). In Zambia (110) several cases of gastro-intestinal poisoning have been reported; however, there exists a continual risk of confusing the toxic *Chlorophyllum molybdites* which tends to occur in the same places as the species discussed. It is never sold in abundance in market stalls (110). The stipe is often not used, being too tough, just as are the mature mushrooms (21). In Zaire the species is of a very widespread use, having reports on its edibility from the regions Shaba (25), Kasai and the region around Binga (61).

Macrolepiota prominens (Viviani: Fr.) Moser – South Africa (76), Zaire (61).

Macrolepiota rhacodes (Vitt.) Sing. – South Africa (76).
Edible and with a pleasant taste, but may cause upset stomach in some people (76).

Macrolepiota zeyheri (Fr.) Sing. – South Africa (38, 76, 78, 103, 128, 135, 141, 142), Zaire (61).
Can be easily confused with related species and with the poisonous *Chlorophyllum molybdites*, and has been confused with related species by Mc Owan (103). The flavour has been said being variable (135), which is possibly related to the state of development of the carpophores at the moment of their collection. Chemical analyses have been published (142): *M. zeyheri* seems to be a more nutritious mushroom than *Agaricus bisporus*, which contains higher concentrations of only Ca and vitamin C; on a fresh mass basis, *M. zeyheri* contains approximately four times as much vitamin B1, three times as much protein, carbohydrate and vitamin B2 and twice as much minerals than *A. bisporus*, whereas the fibre content of *M. zeyheri* is five times higher. In some regions of Zaire (Kivu) the carpophores are not eaten (61).

Marasmius

Marasmius spec. – East Africa (65), Cameroon (67).
Hennings decribed several *Marasmius* species which he reported to be edible: *Marasmius englerianus*, *M. maranguensis* and *M. volkensii* in East Africa (65) and *M. violaceus* and *M. bipindeensis* in Cameroon (67). They have to be boiled first to loose their though consistency (65).

Marasmius acervatus = ***Collybia acervata***

Marasmius buzungolo Sing. – Zaire (125).
Edible, common in the Kinshasa region (125).

Marasmius confluens = ***Collybia confluens***

Marasmius hungo P. Henn. – Cameroon (66).
Eaten as Hungo by the indigenous population.

Marasmius oreades (Bolt.: Fr.) Fr. – South Africa (38, 76).
Edible with some precautions (38); the tough stipes have to be discarded (76).

Melanoleuca

Melanoleuca melaleuca (Pers.: Fr.) Murr. – South Africa (141).

Melanoleuca melaleuca f. ***acystidiata*** Pearson – South Africa (141).

Micropsalliota

Micropsalliota brunneosperma (Sing.) Pegler s.l. Malawi (88, 89, 147).
Edible and well-liked.

Morchella

Morchella conica Pers.: Fr. Botswana (33), South Africa (76, 82, 141).
Poisonous when raw; when cooked produces a poisonous liquid which must be discarded (76). Although it is generally agreed as being one of the best edible species, the South African literature indicates it as being poisonous (141) and best avoided (76).

Morchella esculenta Pers.: Fr. — South Africa (141).
Has been reported on two occasions near Cape Town; it is probable that the fungus is in fact *Morchella conica* (141); considered edible under certain conditions (141).

Morchella intermedia Boud. — Madagascar (74).
Eaten and well-liked by the local populations.

Mycena

Mycena aetites (Fr.) Quél. — South Africa (76).
Edible but large numbers are needed to make a reasonable meal (76).

Mycena aschi P. Henn. — Cameroon (68).

Mycena bipindiensis P. Henn. — Cameroon (68).

Mycena galericulata (Scop.: Fr.) S.F. Gray — South Africa (38).

Mycena pura (Pers.: Fr.) Kumm. — South Africa (76).
Mentioned as "edible but tasteless" (76), but is a slightly poisonous species classified with the gastrointestinal irritants (e.g. 6).

Naucoria

Naucoria semiorbicularis = ***Agrocybe semiorbicularis***
Naucoria vervacti = ***Agrocybe vervacti***

Notophanus

Nothopanus hygrophanus (Mont.) Sing. — Zaire (108).
Edible when young.

Oudemansiella

Oudemansiella radicata (Relh.: Fr.) Sing. — Malawi (88).
In Malawi noted as edible in the Mzuzu district, Mulanje: said to be boiled and dried before eating.

Panaeolina

Panaeolina foenisecii (Pers.: Fr.) R. Mre. — South Africa (141).
Edible. There are various reports on the edibility of this species. Ola'h (95) noted that certain populations contain low levels of psilocybin, a hallucinogenic agent, but according to Stijve et al. (129) this species contains no significant levels of hallucinogenic substances. Furthermore, severe poisoning has occasionally been observed in young children (6).

Panaeolus

Panaeolus campanulatus var. *sphinctrinus* = ***Panaeolus sphinctrinus***

Panaeolus retirugis (Fr.) Gill. — South Africa (141).
Edible. Contains possibly some hallucinogenic agents (6).

Panaeolus semiovatus = ***Annelaria semiovata***

Panaeolus sphinctrinus (Fr.) Quél. — South Africa (141).
Edible. Ola'h (95) reports some psilocybin and psilocin in this species. In the Pacific Northwest of the USA the fungus is used as a recreational drug, found by some users to be devoid of hallucinogenic activity (6). Possibly there exist some chemical races.

Panaeolus subbalteatus (Berk. & Br.) Sacc. — South Africa (141).
Edible. Guzman et al. report that this species is a common recreational drug mushroom in the Pacific Northwest of the USA (6).

Paxillus

Paxillus involutus (Batsch: Fr.) Fr. — South Africa (141).
The species has been reported as being edible in the past. It has since been proven that it contains toxic substances which have a cumulative effect each time the carpophores are eaten. It must be considered poisonous. At least in Europe and Japan its toxicity is well-established.

Paxillus panuoides Fr.: Fr. — South Africa (141).
Edible (141), but not recommended for food (6).

Peziza

Peziza vesiculosa Bull.: Fr. — Zaire (75).
Edible, consumed by the Bwaka.

Phaeogyroporus = ***Phlebopus***

Phallus

Phallus indusiatus (Vent.) Pers. — South Africa (141).
Is said to be edible

Phlebopus

This genus contains the largest boletes known (46), having a cap over 30 cm diam. Some species seem to be edible if certain precautions have been taken.

Phlebopus colossus (Heim) Sing. Madagascar (52), Malawi (89, 147).
Recorded as being eaten in Malawi as Ndiwo, either fresh or dried (89); considered as suspect in Madagascar (52).

Phlebopus portentosus (Berk. & Br.) Boedijn: see ***Phlebopus sudanicus***

Phlebopus sudanicus (Har. & Pat.) Heinemann West Africa (45); Burkina Faso (46), Central African Republic (52), Congo (41), Malawi (88, 89, 147).
Well-liked by indigenous populations (41). Is eaten after cooking in water (45). In Malawi it is dried before cooking and used as Ndiwo (89, 147). In West Africa it is said to cause intoxication (89, 111). Pegler (109) synonymized *Phlebopus portentosus* with *P. sudanicus* but Heinemann and Rammeloo (*Mycotaxon* **15**: 395) consider the first as a closely related species only recorded from A and Australia.

Pholiota

Pholiota aegerita = ***Agrocybe cylindracea***

Pholiota aurivella (Batsch: Fr.) Kumm. — South Africa (38).
Edible, but some precautions have to be taken.

Pholiota carbonaria (Fr.: Fr.) Sing. — South Africa (141).

Pholiota gummosa (Lasch) Quél. — South Africa (141).

Pholiota mutabilis = ***Kuehneromyces mutabilis***
Pholiota praecox = ***Agrocybe praecox***

Pleurotus

In the past the genus name *Pleurotus* has been used for different genera, e.g. *Lentinus* and *Panus*. The genus contains some of the most valuable mushrooms.

Pleurotus djamor (Fr.) Boedijn — Zaire (9, 108).

Pleurotus dryinus (Pers.: Fr.) Kumm. — South Africa (141).

Pleurotus flabellatus = ***Pleurotus djamor***

Pleurotus ostreatus (Jacq.: Fr.) Kumm. — South Africa (38).
Edible. See also page 13: culture of edible fungi.

Pleurotus squarrosulus = ***Lentinus squarrosulus***
Pleurotus tuberregium = ***Lentinus tuberregium***

Pluteus

Pluteus atricapillus = ***Pluteus cervinus***

Pluteus cervinus (Schaeff.) Kumm. — South Africa (38, 141).
Edible; some precautions have to be taken.

Pluteus cervinus var. ***ealaensis*** Beeli — Zaire (71).
Eaten by the Banza.

Pluteus goossensiae = ***Termitomyces striatus***

Pluteus gracilis (Fr.) Quél. — South Africa (141).

Pluteus nanus var. *lutescens* = ***Pluteus romellii***

Pluteus romellii (Britz.) Sacc. — South Africa (141).

Podabrella = *Termitomyces*

Podaxis

Podaxis pistillaris (L.: Pers.) Fr. — Africa (90).
The claim by Morse (90) that native populations in Africa eat *P. pistillaris* is highly suspect (2); the Nupes in Nigeria regard the fungus as poisonous (2), just as it is the case in South Africa (135).

Podaxon = *Podaxis*

Polyporus

Polyporus div. spec. — Tropics (149).
Some species are edible and are sometimes sold in local markets (149).

Polyporus dickensii = ***Bondarzewia berkeleyii***
Polyporus sulphureus = ***Laetiporus sulphureus***

Protohydnum = *Pseudohydnum*

Psalliota = *Agaricus*

Psalliota amethystina = ***Agaricus semotus***
Psalliota termitum = ***Termitomyces*** spec.
Psalliota kiboga: see ***Agaricus*** *spec.*

Psathyrella

Psathyrella atroumbonata Pegler — Malawi (88), Nigeria (97).
In Malawi it is eaten as Ndiwo and is cooked with salt but with very little water (88).

Psathyrella candolleana (Fr.: Fr.) R. Mre. — Malawi (88, 147), South Africa (38, 141).
In Malawi it is cooked as Ndiwo, soft and well-liked, often given to young children; the carpophores are not dried (88).

Psathyrella conopila (Fr.: Fr.) Pearson & Dennis — South Africa (141).

Psathyrella disseminata = ***Coprinus disseminatus***

Psathyrella spadicea (Schaeff.) Sing. — South Africa (141), Zaire: Shaba (25).

Pseudocraterellus

Pseudocraterellus laeticolor Heinemann — Zaire: Shaba (25, 57).
Probably edible (57); edible (25).

Pseudohydnum

Pseudohydnum gelatinosum (Scop.: Fr.) Karst. — Mauritius (105).
The species is eaten raw (105).

Psilocybe

Psilocybe foenisecii = ***Panaeolina foenisecii***
Psilocybe spadicea = ***Psathyrella spadicea***

Pulveroboletus

Pulveroboletus spec. — Malawi (147).
Eaten fresh and not dried.

Pulveroboletus aberrans Heinemann & Goossens — Malawi (88, 147).
Williamson (147) suggested it may be edible, and her notes have the comment 'boil, throw away water and dry, verify'; as with several other boletes it may be edible after boiling and drying, washing out any toxic substances in the process (88).

Pulveroboletus cramesinus = ***Aureoboletus gentilis***

Pulveroboletus hemichrysus (Berk. & Curt.) Sing. – South Africa (76, 141).

Pycnoporus

Pycnoporus sanguineus (L.: Fr.) Murr. – Malawi (88).
Has been recorded as edible when fleshy; occasionally used for dye in West Africa (88).

Rhodocybe

Rhodocybe gemina (Fr.) Kuyp. & Noordel. – South Africa (141).

Rhodopaxillus = *Lepista*

Rubinoboletus

Rubinoboletus luteopurpureus (Beeli) Heinemann & Rammeloo – Malawi (88, 147).
Is considered edible at Lilongwe and Zomba: the carpophores can be boiled and dried after throwing the water away (88).

Russula

Certain *Russula* species are eaten while others are rejected (101). In Malawi the carpophores are cooked either fresh or dried, well-liked as Ndiwo, also eaten as snack roasted in ashes, not bitter tasting; another species must be boiled for very long time, up to 12 hours before eating (147).
Most of the determinations have to be controlled, especially when African collections have been attributed to European species. Recently, Buyck studied the *Russula* species of Central Africa (17); his work is prepared for publication in the *Flore Illustrée des Champignons d'Afrique Centrale*.

Russula spec. – Malawi (147), Tanzania (42), Zaire: Shaba (101).

Russula spec. (Xerampelinae) – South Africa (76).
Edible and good, with a mild taste; said to be nutty and sweet when young (76).

Russula afronigricans Buyck - Zaire (9).

Russula atropurpurea (Krombh.) Britz. – Malawi (21, 88, 147).
Is said to be common in the Miombo woodland; always dried in the sun before cooking; dried for use later in the year, wrapped in leaves of *Uapaca* and hung up in the hut (147).

Russula atrovirens Beeli – Zaire (9).

Russula capensis Pearson — South Africa (38, 76, 128, 135, 141) - Fig. 4.
Edible, but should be cooked when fresh and young; taste just perceptibly peppery to rather tasteless (135). Has a mild mushroom taste (76). It is the favourite food of the grey squirrel which had become acclimatised too successfully in South Africa and seems to take a delight in turning over the carpophores of *R. capensis*, leaving them stalk upwards on the ground (103).

Russula cf. ***cellulata*** Buyck — Zaire: Shaba (25).

Russula cyanoxantha (Schaeff.) Fr. Malawi (88), South Africa (38, 141).
In Malawi it is not eaten in the Zomba district; in the Mulanje district, however, it is commonly collected as Ndiwo by women (88).

Russula cyclosperma Buyck — Zaire (17).
Eaten in the region of Diobo-Mobangi-Binga.

Russula delica Fr. emend. Bres. — Malawi (88, 147).
Cooked as Ndiwo.

Russula cf. ***diffusa*** Buyck var. ***diffusa*** — Zaire: Shaba (25).

Russula lepida Fr. = ***Russula rosea***
Russula nigricans sensu Beeli = ***Russula afronigricans***

Russula ochroleuca Pers. — Malawi (88).
Highly appreciated in Mulanje where it is eagerly collected by women, not recorded as being edible in the Zomba district (88).

Russula pseudostriatoviridis Buyck — Zaire (17).

Russula rosea Pers. — Malawi (88, 89, 147).
Eaten as Ndiwo, but always sun-dried before cooking.

Russula roseoalba Buyck — Zaire: Shaba (25).

Russula roseostriata Buyck — Zaire (17).

Russula schizoderma Pat. — Malawi (88, 89).
A familiar edible species commonly used for Ndiwo and often sold on market stalls (88).

Russula sese Beeli — Zaire (9).

Russula sesemoindu Beeli — Zaire (9).

Russula sesemotani = ***Lactarius sesemotani***

Russula sesenagula Beeli — Zaire (9).

Russula striatoviridis Buyck — Zaire (17).

Russula xerampelina (Schaeff.) Fr. — South Africa (141).

Fig. 4. *Russula capensis* Pearson (x ½)
[redrawn from Pearson (103)]

Schizophyllum

Schizophyllum commune Fr.: Fr. — Tropics (149), Central African Republic (50), Madagascar (45), Malawi (88), Nigeria (97, 151), South Africa (76), Zaire (10, 25, 93, 101, 108), Zambia (110).

A very widespread fungus saprophytic on dead plant material, including culm of sugar cane (45). The species is consumed in large areas of the African and Asian tropics. The indications in the literature as to its culinary value are different from region to region, and even within the same country the appreciation can be different. It is often chewed uncooked (151), or used in soups (50). It is conserved in a dry state for long periods, to be used in periods when favourites are lacking (88, 110). If carpophores have been dried, they are simply soaked in water for several hours before cooking (101). A rather general feature is that the carpophores are cooked in ash water, an alkaline solution traditionally prepared from burnt plant material (45, 88, 101, 110) (in recent times sometimes substituted by baking powder), having a tenderising effect (110). After a long cooking period (up to two hours) the mushrooms are drained, mixed with sifted peanuts, seasoned with a little salt and a final addition of oil (101), or they are cooked with red pepper, salt and oil and used to provide as a wholesome meal (151).

Schulzeria

Schulzeria umkowaan = ***Termitomyces umkowaanii***

Scleroderma

Scleroderma bovonei Mattirollo — Zaire (83).
An excellent hypogeous fungus, possibly not recorded again since the time of its description. Mattirollo (83) reports of an unintentionally succesfull artificial mycorrhization in a garden!

Stereopsis

Stereopsis hiscens (Berk. & Rav.) Reid — Malawi (89).

Strobilomyces

Strobilomyces costatispora (Beeli) Gilbert — Malawi (147), Zambia (114).
Is usually not eaten fresh owing to unpleasant taste, but dried and stored hung up in smoky hut, to be reconstituted for consumption, being cooked as Ndiwo.
Strobilomyces costatispora will be transferred to *Afroboletus* (Heinemann & Rammeloo, in preparation).

Strobilomyces luteolus = ***Afroboletus luteolus***

Stropharia

Most members of this genus should be avoided as a food source. Little is known about the edibility of the members of *Stropharia*; there are as well reports on their edibility as on their poisonous character. In Europe *Stropharia rugoso-annulata* is cultured on a commercial scale.

Stropharia coronilla (Bull.: Fr.) Quél. — South Africa (141).
Edible. It is better to avoid this species. A few cases of poisoning with this species have been described (6); the poisoning is characterised by gastrointestinal reactions, visions and delirium.

Stropharia melasperma (Bull.: Fr.) Quél. — South Africa (141).

Stropharia semiglobata (Batsch: Fr.) Quél. — South Africa (141).

Stropharia semiglobata var. *thrausta* = ***Stropharia squamosa*** var. ***thrausta***

Stropharia squamosa var. ***thrausta*** (Schulz ap. Kalchbr.) Massee — South Africa (141).

Suillus

Suillus bellinii (Inzenga) O. Kuntze — South Africa (38, 76, 128, 135, 141).
Soft tubes and sticky skin over the cap should be removed before cooking (135); tends to be soggy, so it is best used in stews or duxelles (76).

Suillus boudieri = ***Suillus bellinii***

Suillus bovinus (L.: Fr.) O. Kuntze — South Africa (38, 128, 135, 141).
Edible but somewhat tasteless; sticky slime over cap and soft tubes should be removed before cooking (135).

Suillus bovinus var. ***viridocaerulescens*** Pearson — South Africa (141).

Suillus granulatus (L.: Fr.) O. Kuntze — Malawi (21, 88, 147), Madagascar (45), South Africa (38, 76), Zambia (112, 117, 118).
This fungus is probably introduced as a mycorrhizal associate of *Pinus*. It became, however, very common in *Uapaca* woodland (21). The carpophores decay quickly after collection and are therefore boiled and dried; specimens cooked immediately after collection are less tasty than dried ones (21). It is recommended to remove the slimy cuticle of the cap before cooking (76). The sundried specimens are cooked, the first water being thrown away, the carpophores are well-liked but will not keep well after drying (147). A chemical analysis of the constituents has been made (117). In Zambia, where no other boletes are widely eaten, the appearance of *S. granulatus* has hampered its recognition as an edible fungus; many people who have become regular consumers of the mushroom still do not regard it as pleasing to the eye (88). Its consumption is promoted in Zambia (117). The commonsense precaution of avoiding over-mature specimens is observed, as they may be toxic. It is not a widely accepted as an edible species among forestry workers in Zambia (88).

Suillus grevillei (Klotzsch: Fr.) Sing. — South Africa (38).
Edible, certain precautions have to be taken into account.

Suillus luteus (L.: Fr.) S.F. Gray — Malawi (21), South Africa (38).
Is a delicacy but requires care during collection (21).

Terfezia

Truffles belonging to the genus *Terfezia* are well known and regularly consumed as "Terfez" in northern Africa. In southern Africa (South Africa, Namibia, Botswana), *Terfezia* truffles are also much sought after by men and animals. In the Kalahari desert Bushmen regard it as a major foodstuff and they detect it by the cracks arising as the truffles develop (Tanaka, cited in 33). Occasionally they roast the truffles (79).
Until 1973 only two *Terfezia* species have been found in southern Africa (*T. pfeilii* and *T. austroafricana*) as all earlier records of *T. boudieri* and *T. claveryi* were redetermined as the edible species *T. pfeilii* (81), but later reports (33, 76) do mention *T. boudieri* and *T. claveryi* for this region.

The only known record of *Terfezia* truffles in tropical Africa is *T. decaryi*, described from Madagascar by Heim; he reported that this species was not eaten by the indigenous population but is probably edible judging its taste (43).

Terfezia boudieri Chatin — Kalahari desert (33), South Africa (76).
Edible and good.

Terfezia claveryi Chatin — South Africa (76).
Edible and good.

Terfezia pfeilii P. Henn. — Southern Africa (66, 76, 82, 130).
Much esteemed by the Bushmen in the Kalahari desert (82, 130) and eaten by black and white populations in South Africa (66, 76).

Termitomyces

These fungi are highly appreciated in the whole of Africa. All species are edible; some, however, are preferred to others because of their culinary value. Although they seldom occur in great numbers and are highly perishable, they are eagerly sought and exhaustively cropped by mushroom hunters (116). They are often considered as being far superior to all other mushrooms (149) having higher than average nutritional values (91, 101). In the Shaba region (Zaire) and in the whole Zambesian Miombo region the *Termitomyces* species occupy the third place after *Cantharellus* and *Amanita* species (110). The oldest indication of their edibility dates from Livingstones notes (115).

Termitomyces spec. — Tropics (54, 149), Angola (109), Lesotho (40), Madagascar (30), Malawi (147), Nigeria (2), South Africa (78, 135, 141), Tanzania (42), Zaire (101), Zambia (110, 116).
The edible *Lepiota missionis* Berk. var. *radicata* Eichelbaum in Tanzania (32) probably also refers to a *Termitomyces* spec.

Termitomyces albus = ***Termitomyces schimperi***

Termitomyces aurantiacus (Heim) Heim — Malawi (89), Zaire (25, 49, 101).
In Zaire a strongly appreciated species as well by the Europeans as by the African populations (49). In Malawi it is highly favoured as relish (89).

Termitomyces cartilagineus = ***Termitomyces eurhizus***

Termitomyces clypeatus Heim — Tropics (149), Central African Republic (50), Malawi (21, 88, 147), Nigeria (94, 97, 151), Zaire (49), Zambia (110, 114) — Fig. 5c.
Is a very well-liked species (49, 88, 114, 147), occurring at the beginning of the rainy season (97, 110). Is very esculent (114) and soft-fleshed often given to children because of this (88); the stipes are avoided because they are too tough (110).
In Zambia it shares the common name with that for winged termites, a fact well

Fig. 5. a, *Termitomyces microcarpus* (Berk. & Br.) Heim; b, *T. robustus* (Beeli) Heim; c, *T. clypeatus* Heim. [redrawn from Heim (49)]

reflecting the close association between the two (114). In Malawi it is prepared with groundnuts (147); the taste is described by some as being nutty (88).

Termitomyces eurhizus (Berk.) Heim — Kenya (111), Malawi (21, 88, 89, 147), South Africa (78), Zambia (110).

Is widely used as food and well-liked. Is said to have a slightly bitter taste when cooked (111); it is used fresh or dried (88, 89, 147); as it does not soften easily potashes are sometimes added (147). The fungus appears early in the rainy season (21). It is suggested that the mushroom called by the Bantoes "I'Kowe" or "Umkowaan" is possibly a large variety of *Termitomyces eurhizus*.

Termitomyces globulus Heim & Goossens — Tropics (149), Nigeria (94, 97, 151), Zaire (49).

Said to be a very good edible species (49). Very popular in Nigeria (94).

Termitomyces letestui (Pat.) Heim — Congo (45), Ivory Coast (45), Ghana (70), Zaire (8, 25, 49, 101).

The appreciation about its culinary value is not unanimous: described as rather poor and tough by Le Testu (45), said to be strongly appreciated by the Europeans and the local population in Zaire (49).

Termitomyces mammiformis Heim — Tropics (149), Nigeria (97, 151), Zaire (49).

Said to be good (49).

Termitomyces medius Heim & Grassé — Zambia (110).

An uncommon edible species (110).

Termitomyces microcarpus (Berk. & Br.) Heim — Tropics (149), Malawi (21, 86, 89, 147), Nigeria (94, 97, 98, 151), South Africa (38, 49, 76, 78, 135, 141), Uganda (91), Zaire (25, 49, 100, 101), Zambia (110, 114) - Fig. 5a.

On the whole the species is very well-liked, although large numbers of carpophores are necessary to make up a meal because of the small dimensions; because it fructifies in very large clusters collecting is easy; the carpophores deteriorate very quickly. Only in Zambia it is said to be a moderately popular species (110). The fungi and the mycelium are dug up, cooked fresh or dried after pounding (147); it is widely used across Africa in soups (147); has a good flavour and remains somewhat crisp in texture (147). In another account it is said to be almost tasteless (21).

This fungus contains a proteolytic enzyme (100) breaking casein down into small peptides with about the same speed as papain does; furthermore the enzyme has a high degree of thermostability.

Botha and Eicker studied cultures of several *Termitomyces* species (*Mycol. Res.* **95**: 435-443) and suggested that *T. microcarpus* should be better transferred to the genus *Podabrella* Sing.

Termitomyces robustus (Beeli) Heim – Tropics (149), Malawi (88, 147), Nigeria (1, 94, 97, 98, 151), Uganda (109), Zaire (49) – Fig. 5b.
A highly appreciated mushroom, sometimes considered as "the sweetest of all mushrooms" (97).

Termitomyces schimperi (Pat.) Heim – Central African Republic (52), Malawi (88, 89, 147), Namibia (138), Zaire (25, 101), Zambia (110).
Is said to be a strongly appreciated delicacy (52) or to be rather unpopular owing to a reputed bitter taste, which, however, is present only in specimens that are not perfectly fresh (110). Is on sale in the markets (88, 147), or never sold in the markets being only occasionally cropped on a domestic scale (110).

Termitomyces striatus (Beeli) Heim – Tropics (149), Malawi (88, 89, 147), Nigeria (151), Zaire (10, 25, 49).
Well-liked species.

Termitomyces striatus f. (or 'var.') *aurantiacus* = ***Termitomyces aurantiacus***

Termitomyces titanicus Pegler & Piearce – Burundi (Rammeloo, pers. observ.), Malawi (86, 88), Zaire ?(101), Zambia (110, 114, 116).
Only the pileus is eaten but it is often cropped and sold, for the ease of handling, with the stipe and some of the pseudorhiza attached; has a pleasant odour and taste but is expensive and quickly perishable (110). The *Termitomyces* species mentioned from Zaire (101), having a cap diameter of 80 cm, is probably this species.

Termitomyces umkowaanii (Cooke & Massee) Reid – Ciskei (33), Namibia (33), South Africa (38, 76, 134, 137).
Pleasantly tasty (76, 134). The large "*Agaricus* species" mentioned by Marloth (82), "forming a welcome addition to the native diet", possibly also refers to this species (33).

Tremella

Tremella spec. – Tropics (149).
A few species are edible.

Tremella fuciformis Berk. – East Africa (65).

Tremella mesenterica Retz.: Fr. – South Africa (38).
Edible; certain precautions have to be taken.

Tricholoma

Tricholoma spec. – Uganda (91).

Tricholoma albobrunneum (Pers.: Fr.) Kumm. – South Africa (76, 141).
Edible but with poor taste (76).

Tricholoma gambosum = ***Calocybe gambosa***

Tricholoma lobayense Heim — Tropics (149), Malawi (21), Nigeria (94, 151).
Seems to be a frequently found species in Africa. Is sold in the local markets as well fresh or dried (149). Has a pleasant smell: the freshly picked mushrooms are carefully cleaned and peeled before selling (151). In Nigeria it is regarded as a delicacy among the edible mushrooms (151).

Tricholoma mauritianum Peerally & Sutra — Mauritius (104, 106, 107).
The species is edible but contains, just as *T. spectabilis*, cyanide (104). It is toxic when eaten raw but excellent when cooked (106). The toxicity is extensively discussed (106).

Tricholoma melaleucum = ***Melanoleuca melaleuca***
Tricholoma nudum = ***Lepista nuda***
Tricholoma panaeolum = ***Lepista luscina***
Tricholoma personatum = ***Lepista saeva***

Tricholoma saponaceum (Fr.) Kumm. — South Africa (76).
Edible but poor, because taste and smell are reminiscent of "old-fashioned kitchen soup" (76).

Tricholoma scabrum Dufour — Madagascar (30).

Tricholoma spectabilis Peerally & Sutra — Mauritius (104, 106, 107).
A giant species occurring in association with the sugar cane plant; toxic when raw, excellent when cooked; having a cyanhydric odour (104, 106).

Tricholoma sublilacinum Cleland — South Africa (141).

Tricholoma truncatum = ***Rhodocybe gemina***

Trogia

Trogia infundibuliformis (Berk. & Br.) Corner — Zaire (108).

Tubaria

Tubaria furfuracea (Pers.: Fr.) Gill. — South Africa (141).

Tubosaeta

Tubosaeta brunneosetosa (Sing.) Horak — Malawi (147).
Said to be eaten by the Atonga (147).

Tubosaeta calocystis = ***Tubosaeta brunneosetosa***

Vascellum

Vascellum pratense (Pers.: Pers.) Kreisel – Malawi (88), South Africa (38, 76, 128, 135, 141).

Said to be edible when young, being still white inside (76, 88). Tastes like cooked brains (135).

Verpa

Verpa conica (O. Müller: Fr.) Swartz – South Africa (38).

Edible, with some precautions.

Volvaria = *Volvariella*

Volvariella

Volvariella bombycina (Schaeff.: Fr.) Sing. – Tanzania (32), Zaire (63).

This species is considered being edible in temperate regions; in central Africa, however, it seems not to be eaten (63).

Volvariella esculenta = ***Volvariella volvacea***

Volvariella gloiocephala (DC: Fr.) Boekh. & End. – South Africa (38, 76, 128, 141).

Very mild: cap should be peeled to remove slimy covering (76). In Zaire apparently not consumed (63).

Volvariella media (Schum.: Fr.) Sing. – South Africa (141).

Volvariella parvispora Heinemann – Zaire (63).

Young carpophores are consumed in certain regions of the country (63).

Volvariella speciosa = ***Volvariella gloiocephala***

Volvariella volvacea (Bull.: Fr.) Sing. – Central African Republic (55), Ghana (23, 70, 123), Madagascar (16, 45, 104), Malawi (89, 147), Mauritius (104), Nigeria (97, 151), La Réunion (105), South Africa (38), Zanzibar (105).

This species is widely known to be edible. It is found in nature; often, however, it is cultivated (23, 45, 40, 70, 104, 105, 151), but never on an industrial scale as it is the case in Asia. This rather extensive culture has been made on various waste material: on fallen and rotting oil palm trunks and palm-kernel-refuse in Nigeria (151); on various industrial vegetable residues (distillation of "clou de girofle", citronella, manioc and coffee pulp) and on rice straw in Madagascar (104, 105); on banana waste material, on molasses and on remnants from the distillation of *Geranium* (105) at La Réunion and Zanzibar (105), on heaps of peelings from *Xanthosma sagittifolium* corms, on *Manihot utilissima* tubers, on *Elaeis guineensis* trunks felled for palm-wine manufacture (23) in former Gold Coast (Ghana). It is much appreciated by the

European and African populations, sold fresh on the markets. In Nigeria the fungus is commonly used by farmers for seasoning soup (97). It is described (89, 147) as being medium strong flavoured when sauteed, leaving a slightly bitter taste in the mouth which is lacking when boiled. The physiology of the growing mycelium and the formation of chlamydospores has been studied in detail on a local isolate from oil palm (123), using liquid laboratory cultures.

Xerocomus

Xerocomus badius (Fr.: Fr.) Kühn. ex Gilb. — South Africa (38, 76, 141).
Edible and good.

Xerocomus chrysenteron (Bull.: St. Am.) Quél. — South Africa (76, 128, 141).
Not considered as a very palatable species.

Xerocomus pallidosporus Heinemann and *X.* cf. ***pallidosporus*** — Malawi (88, 117), Zaire (101).
Dried before cooking (88, 147).

Xerocomus soyeri Heinemann — Malawi (21, 88, 147).
Dried before cooking (88, 147); very common in *Uapaca* woodlands (21).

Xerocomus versicolor (Rostk.) Quél. s.l. — Madagascar (45).
Is probably a synonym of *X. rubellus* (Krombh.) Quél. This name has been used by Heim to indicate a complex of species. We cannot interpret this indication correctly; according to Heinemann (pers. comm.) it is probably a *Tubosaeta* species. Furthermore, fungi are indicated of which the flesh is though, which is certainly not the case with typical *Xerocomus* species.

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