Wild edible mushrooms from the Selous-Niassa Wildlife Corridor in Ruvuma Region, Tanzania

1cm

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The Selous-Niassa Wildlife Corridor (*Us-horoba*) in Ruvuma Region provides a significant biological link between the Selous Game Reserve in southern Tanzania and the Niassa Game Reserve in northern Mozambique.

Nearly pristine miombo woodlands cover most of the vast Corridor of 10000 km^2. The Corridor is protected with a network of village Wildlife Management Areas designated for community-based natural resource management with a focus on wildlife. The adjacent communities of the Corridor are highly dependent on natural resources. Therefore, income-generating activities involving the sustainable use of natural resources are encouraged what will also contribute to the acceptance of conservation measures.

Additional information are available on **www.selous-niassa-corridor.com**

The remote area is sparsely populated and very rich in natural products particularly in mushrooms. During the rainy season large quantities of wild edible mushrooms are growing within the miombo woodlands of the Corridor. Since time immemorial locals are consuming the tasty mushrooms of high nutritious values. Over 40 wild edible mushrooms have been identified together with the local communities including four species of the highly priced chanterelles. Wild edible mushrooms are much valued by the locals and are an important component of their daily diet during the rainy season. In addition, the large abundance of highly priced mushrooms within the Selous-Niassa Wildlife Corridor represent a real marketing potential what would create additional income to the adjacent local communities.

Instructions

Sustainable harvesting

Clearing of forests and woodlands for various land-uses is the major threat to mushrooms. Traditional slash-and-burn methods (shifting cultivation) in the miombo areas barely harms the mycorrhizal mushrooms since most trees stay alive after cutting and sprout vigorously when it becomes fallow again. When trees stay alive, also their numerous mycorrhizal mushrooms flourish. However, when trees are girdled, they as well as their mycorrhizal fungi die. Fire does not harm mushrooms directly since they occur in the dry season when mushroom are absent (except those growing on wood) and the burning may not affect the mycelia protected in the soil. However, hot late dry season burning may cause the killing of trees along with their mycorrizahl fungi. Disturbances to termite mound should be minimised in view of protecting the growth of Termitomyces. The risk of resource degradation through over-harvesting is minimal if some guidelines (see below) are respected.

Mushroom foray

Careful mushroom picking is very important to meet high quality and hygiene standards for the successful marketing of mushrooms. Mushrooms should be cut off near the ground (instead of plucking) and remaining soil from the base of the stipe should be cut off to keep the mushrooms clean in the container thereby avoiding any later washing. This technique also does not harm the mycelium. Only impeccable mushrooms and not fretted or mouldy ones should be picked. Every mushroom should be cut into two halves to see if there any maggots inside. Very young or old edible mushrooms should not be picked and uninteresting mushrooms should not be scrunched deliberately. Mushrooms in exotic tree plantations should not be picked because some of mushrooms might be introduced poisonous ones.

Identification of mushrooms

Mushrooms have to be identified carefully in order to avoid poisoning. Good smell or the fact that animals are eating a specific mushroom cannot be used as a criterion to distinguish edible from poisonous ones. An unequivocal identification of mushroom species has to be based on several typical characteristics as outlined in this leaflet for the presented mushrooms.

Container

Weave baskets made of organic material should be used for picking mushrooms. Closed containers like plastic bags or buckets accelerate the decomposition of the mushrooms. Stacking layers of mushrooms should be avoided since mushrooms are very delicate and risk to be spoiled quickly. The same principle should also be applied for packaging the mushrooms for its transport from the collection centres to the market.

Drying techniques

Mushrooms should be cleaned and cut in slices of 3-4 mm of thickness before drying in the sun. The drying should be as rapid as possible in view of keeping most of the highly volatile flavour. Only impeccable mushrooms should be used for preservation. Fully dried mushrooms break very easily. Dried mushrooms should be preserved in a covered container to prevent them from absorbing air moisture what would accelerate spoiling of the mushrooms by microorganisms. Drying does not kill the microorganism in mushrooms, but it prevents their growth forcing them into a dormant phase. Pre-boiling kills the microorganisms but with this method, mushrooms become very hard requiring a long soaking and cooking time. In addition, valuable minerals are partially lost in the disposed water.

The description of the species specific characteristics and the brief glossary widely follow Härkönen, Niemelä and Mwasumbi (Tanzanian mushrooms. Edible, harmful and other fungi. 2003). Vernacular names are given in brackets, first in Ndendeule, second in Yao.

Glossary

Cap:	the portion of a fruit body composed of both vegetative and reproductive hyphae. Mycorrhiza(e): are fungi that associate with plant roots, and form a symbiotic relationship; ectomycorrhiza(e): mycelia only on root surface of trees. Adj.: mycorrhizal.
Flesh:	sterile tissue.
Fruit body:	the overall structure of fungal tissue produced for reproduction.
Gill:	a plate-like structure on the underside of the cap on which spores are born.
Hypha(e):	filament made of a row of fungal cells.
Mycelium:	(pl. mycelia) the vegetative stage of the fungi, being composed of hyphae.
Parasite:	growing on or in another living organism from which it obtains nourishment. Adj.: parasitic.
Pore:	a small circular opening of the tubes containing the spores (polypores mushrooms).
Pseudorrhiza:	a root-like underground extension of the stipe.
Ring:	(annulus) remnant of partial veil on stipe.
Spore:	a reproductive propagule.
Stipe:	the stalk of a mushroom.
Symbiose:	two unlike organisms who are living together with mutual benefit. Adj.: symbiotic.
Veil:	a membrane covering the gills of a developing fruit body.
Volva:	a cap-like remnant of universal veil around the base of a stipe.

Edibility

*	= edible species
**	= good edible species
***	= edible, delicious

Amanita loosii

[Ulelema, Utenga]

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Cap:	9–25 cm in diam. young fruit bodies hemispherical, expanding to convex or flat, surface pale olivaceous brown at centre, fading to ivory towards the margin, viscid, smooth except the striate margin, old specimens nearly white.
Stipe:	stout, 8–18 x 2–3 cm, white, equal to bulbous with saccate, greyish-white volva; ring superior, broad, large, thin and white, upper side finely pleated.
Gills:	free, crowded, and thin, up to 19 mm broad, margin smooth or sometimes crenulate.
Flesh:	white; soft to firm in cap, up to 12 mm thick; fibrous and relatively brittle in stipe and usually hollow.
Smell/taste:	mild.
Particularities:	the fungus emerges like a white egg, before splitting at the apex to reveal the cap. Not easy to conserve due to the quickly deteriorating flesh. Ectomycorrhizal fungus.
Possibilities of confusion:	With other whitish Amanita species of uncertain edibility. Confusion with the highly poisonous Death cap (Amanita phalloides) is limited since this introduced mushroom is only growing in exotic tree plantations and never in miombo woodlands.
Habitat:	miombo woodlands.

Amanita masasiensis

[Kagongoro, Nakajongoro]

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Cap:	3–7 cm in diam. at first convex, becoming flat, yellow orange, darker and redder at centre, surface smooth, slightly sticky, striate at the margin.
Stipe:	cylindrical, 6–7 x 0.9–1.1 cm, yellow, surface more or less fluffy; volva white, high and broad, saccate; ring superior, hanging, thin, orange-yellow.
Gills:	free, fairly crowded and thin, yellow.
Flesh:	white (under pellicle yellowish), in cap soft to firm, in stipe brittle-fibrous to hollow.
Smell:	indistinct.
Taste:	mild.
Particularities:	the fungus emerges like a white egg, before splitting at the apex to reveal the cap. Ectomycorrhizal fungus.
Possibilities of confusion:	closely related to *A. tanzanica.*
Habitat:	miombo woodlands.

Amanita tanzanica

[Kagongoro, Nakajongoro/Nakasou]

*/**

Cap:	5–11 cm in diam. at first convex, becoming flat, surface bright to dark orange, becoming paler and having more ochraceous tint with age, silky, smooth, sticky, margin striate.
Stipe:	8–13 x 0.5–2 cm, equal but extreme base attenuate, surface white; above ring finely striate, below it slightly floccose.
Gills:	free, white, fairly crowded and thin, up to 9 mm wide, margin smooth.
Flesh:	in cap fairly firm, white but yellowish under pellicle; in stipe white, brittle-fibrous, later hollow.
Smell:	slightly earth-like.
Taste:	mild, pleasant.
Particularities:	the fungus emerges like a white egg, before splitting at the apex to reveal the cap. Deteriorates rather soon and so it is not suitable for preservation by drying. Ectomycorrhizal fungus.
Possibilities of confusion:	closely related to *A. masasiensis*. Can be confused with *Amanita muscaria* which, however, usually has white flecks on its red cap and most important only grows in exotic tree plantations and never in miombo woodlands.
Habitat:	miombo woodlands.

Cantharellus congolensis

[Langakora mwinyo, Chipatwe che piliu]

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Cap:	3–10 cm in diam. fairly thick, convex with central depression, becoming concave, margin regular or lobed, surface brownish fuliginous, tomentose with darker flocci becoming black with age or on bruising.
Stipe:	5–6 x 1.5–2 cm, cylindrical or tapering downwards, same colour as cap.
Gill-folds:	decurrent, fairly crowded, narrow and shallow, sooty black, forming network.
Flesh:	firm and fibrous, greyish, then pinkish, blackening on exposure.
Smell:	acrid, mushroomy.
Taste:	mild, pleasant.
Particularities:	ectomycorrhizal fungus.
Habitat:	in groups in miombo woodlands.

Cantharellus cf. floridula

[Unguyugu mdogo, Nakachejwa/ Kunguro kwetiti]

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Cap:	1–2.5 cm in diam. very thin, funnel-shaped with expanded margin, smooth, intensive red.
Stipe:	1–3 x 0.2–0.5 cm, relatively long, cylindrical, somewhat curved, smooth, same but lighter colour as cap.
Gill-folds:	decurrent, close, thin, up to 1 mm wide, forked but not interveined, same but lighter colour as cap surface.
Flesh:	in cap very thin, in stipe fibrous, reddish.
Smell:	faint fruity.
Taste:	mild.
Particularities:	ectomycorrhizal fungus.
Habitat:	gregarious in miombo woodlands.

Cantharellus isabellinus

[Unguyugu, Upatwe/Chipatwe cha njano]

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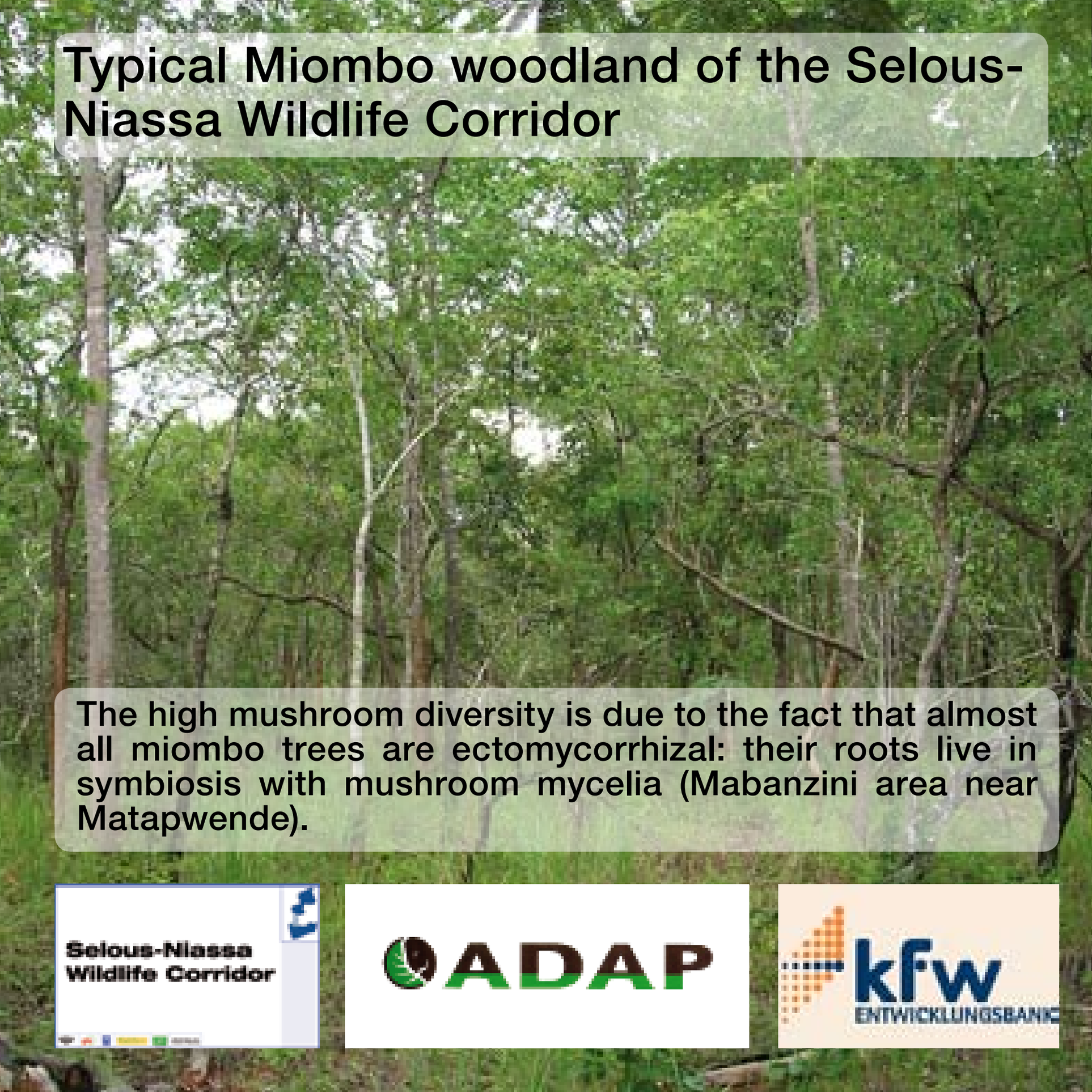
Cap:	3–7 (–20) cm in diam. fleshy in the centre, at first convex and slightly depressed in the middle, then irregularly funnel-shaped and wavy; surface brownish yellow with tiny brown scales, most abundant at the centre.
Stipe:	3–4 x 0.8–1 cm, solid, cylindrical or slightly tapering or thickening downwards, straight or sometimes curved, surface almost white, becoming ochraceous from below upwards, apex hairy.
Gill-folds:	decurrent, subdistant, fairly thin, up to 4 mm wide, unequal, sometimes forked, intervals faintly veined, at first ochraceous, becoming pale yellow and the pale pink.
Flesh:	soft, rather fibrous, white, turning bright yellow on exposure, especially at stipe base.
Smell:	pleasant, fruity.
Taste:	mild.
Particularities:	*C. isabellinus* resembles *C. cibarius* which in particular is highly appreciated in Europe, but is paler and has more white flesh. Ectomycorrhizal fungus.
Habitat:	miombo woodlands.

Typical Miombo woodland of the Selous-Niassa Wildlife Corridor



The high mushroom diversity is due to the fact that almost all miombo trees are ectomycorrhizal: their roots live in symbiosis with mushroom mycelia (Mabanzini area near Matapwende).

Selous-Niassa Wildlife Corridor

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Cantharellus platyphyllus

[Nakachejwa/ Kunguro kwetiti]

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Cap:	2–5 (–10) cm in diam. fleshy, first convex, at centre depressed, margin incurved and often regularly wavy, then irregularly funnel-shaped with expanded and undulating margin; surface red at centre, becoming orange towards margin, matt, radially furrowed.
Stipe:	2–4 (–7) x 0.6–1.2 (–2) cm, equal to tapering, often curved, surface smooth, tinged with red, orange or yellow.
Gill-folds:	decurrent , distant, pale to bright yellow.
Flesh:	reddish under surface, otherwise white, sometimes obtaining a faint greenish tint when cut.
Smell:	fruity.
Taste:	slightly bitter.
Particularities:	ectomycorrhizal fungus.
Habitat:	miombo woodlands.

Lactarius edulis

[Upoa/Masikio ya jeuri, Uboa]

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Cap:	4–9 cm in diam. at first convex, margin incurved, then uplifted, margin irregular and wavy; surface ochraceous, darker at centre, matt, tomentose, smooth, old fruit bodies divided by cracks into small areas.
Stipe:	2.5–4.5 x 1.6–2.1 cm, equal, eccentric, brittle, ochraceous cream, surface smooth, matt.
Gills:	decurrent, fairly distant, up to 6 mm broad, ochraceous cream, margin entire.
Flesh:	white, solid, in cap up to 16 mm thick, milk latex scanty.
Smell:	weak.
Taste:	mild.
Particularities:	ectomycorrhizal fungus.
Habitat:	miombo woodlands.

Lactarius volemoides

[Chaundila, Nakandanga/ Nakasuku]

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Cap:	4.5–9 cm in diam. at first convex, margin incurved then uplifted; surface orange or orange-brown, darker at centre (navel), tomentose, slightly wrinkled.
Stipe:	2–3.5 x 0.6–2 cm, tapering downwards, brittle, same but lighter colour as cap surface.
Gills:	decurrent, distant, thick, up to 7 mm broad, white or cream, margin smooth.
Flesh:	white, stipe often eaten by maggots, milk latex white and abundant.
Smell:	weak, fishy.
Taste:	mild.
Particularities:	ectomycorrhizal fungus.
Habitat:	miombo woodlands.

Russula cellulata

[Usinda, Uzinda]

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Cap:	4–9 cm in diam. at first convex then flattened and widely depressed, pale olivaceous brown at centre becoming greyish brown towards the margin, matt, edge finely divided by cracks exposing white flesh.
Stipe:	3–5 x 1–2 cm, cylindrical, brittle, greyish cream, base rounded and ochraceous.
Gills:	sinuate to free, crowded, fairly thin, up to 10 mm broad, often forked, cream.
Flesh:	white; in cap rather firm, in stipe somewhat stuffed.
Smell/taste:	mild.
Particularities:	ectomycorrhizal fungus.
Habitat:	miombo woodlands.

Termitomyces letestui

[Mislaji, Maize field]

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Cap:	at first subglobose and involute then convex to flat, up to 34 cm in diam. when fully opened, always with a knob at the centre; surface cream coloured to light-brown at margin becoming brown to sepia towards the centre, sometimes of same colour, matt-fibrillose, felted tomentose becoming finely scaled.
Stipe:	5–15 x 1–3.5 cm, cylindrical, solid, white or whitish, tapering gradually into a long pseudorrhiza up to 1 m long; ring thick, membranous, striated above, superior, and pendant.
Gills:	free, crowded, thin, up to 12 mm broad, edge sometimes delicately crenate, whitish to cream with pinkish tint.
Flesh:	white; firm to soft in cap, up to 25 mm thick, in stipe fibrous up to the knob on the cap.
Smell:	strong and pleasant, like fresh peanuts.
Taste:	mild, pleasant.
Particularities:	symbiotic life together with termites; termites cultivate the mycelium in their nests and fruit bodies can be seen arising on or near the mounds.
Habitat:	on or near termite mounds in cultivated fields.

Ganoderma sp.

Fruit body:	perennial, sessile, flattened, hard crust, 20–30 (–40) cm wide, 5–10 cm thick, edge rounded; upper surface fissured, creamy greyish to sooty black, matt.
Pore:	surface white.
Medicinal uses:	treat asthma and cough.
Particularities:	parasitic fungus attacking living trees.
Habitat:	growing on *Pericopsis angolensis* (Mbanga, Muvanga).

Mushroom hunting

Mushroom hunting is very popular mainly amongst women and children within the Selous-Niassa Wildlife Corridor (Naheno area near Likuyu Seka). Most households eat mushrooms three to four times a week when they arae available during the rainy season. This is usually also the period of food shortage.

Market

Women are selling Russula cellulata at soko mjinga near the hospital at Songea. Wild edible mushrooms are frequently sold in Ruvuma Region at main and informal markets of Songea and Tunduru and more sporadically at several village markets.