

SUGGESTIONS FOR COLLECTING FUNGI

by Donald P. Rogers

Fungi parasitic on leaves or other plant parts are almost entirely unrecorded from atolls. Many of these occur as or in leaf-spots; the fungus fructification may be a superficial pustule or an embedded fruiting chamber (perithecium or pycnidium), often surrounded by a dead or discolored area of the leaf. The distinction between infected leaves and those merely damaged by insects or mechanical injury is not always easy in the field. Often close inspection by a hand-lens is necessary to reveal the fructification; and even then the ostiole of a pycnidium may appear as no more than a brownish, or blackish fleck in a discolored area. Other parasites, the sooty molds, may form wide-spread blackish incrustations. Occasionally a fungus (such as the downy mildew on Boerhavia) causes marked distortion of the host. All parasites on herbaceous plant-parts are treated as the host alone would be-- that is, pressed, preferably along with sufficient host material to confirm the identification of the latter. Parasitized woody parts are dried without pressing. Slabs cut from a stem will dry more quickly than sections of the entire stem, and since the fungus fructifications are not apt to be deep, are just as useful as larger pieces. Where there can be any question of the identify of the host, material sufficient for identification should be pressed to accompany woody specimens.

Although the specific identity of the substrata of non-parasitic fungi is of less importance, it should wherever possible be noted. Such fungi occur on soil (but not so commonly as in temperate regions), on dung, and on dead plant material, including worked wood and fiber. Standing trees or stumps, fallen logs (a rich and interesting source of fungi), accumulations of dead vegetation on the ground and especially in trash-pits--all serve as substrata for saprobic fungi and should be examined. Fungi are apt to be present although not visible in soils and humus of the first shrub-zone of the upper beach, of forested areas and of the wet pits planted to Cyrtosperma and banana; samples of soil, and of dung, thoroughly dried and wrapped so as to minimize contamination, can serve as a source of cultures of such fungi as mucors and water-molds even after months or years.

Myxomycetes. The fructifications resemble minute puffballs or stalked globes or eggs, or may be sessile and effused. They are extremely fragile; and although usable specimens may be kept in paper packets, the usual and better practice is to wedge or pin portions of their substratum into the tray of a penny match-box or similar small box. Myxomycetes are found on decaying plant debris and on stumps and logs, or sometimes on sound trees or wood where they have migrated to fruit.

Phycomycetes. Most forms will be invisible and must be isolated by culture methods from dung or soil samples. One is known as a systemic parasite of Boerhavia; other such downy mildews may be found. Glaziella forms hollow red fleshy fructifications, up to 2 inches across, in trash on the ground. If it is found, the exact color of living specimens should be noted. A piece of printed paper, such as a cigarette package, will serve as a color-standard.

Ascomycetes. Many leaf-spot fungi belong here. In addition, some saprobes will be found. Cup-fungi occur on soil or dead wood, and may occur also on dead herbage. They are firm enough to be dried readily. Pyrenomycetes, hard-fleshy to woody or carbonaceous growths, sometimes bright-colored but often coal-black, develop especially on dead wood. Some are minute and mammiform; many are embedded in the substratum, with only the ostiole or beak of the perithecium protruding; others form encrusting layers or large nodular to club- or antler-like growths. Readily dried.

Basidiomycetes. For the satisfactory identification of most Hymenomycetes (those Basidiomycetes with exposed fruiting surfaces) a spore-print is of considerable use, although for most it is not of critical importance. To secure a spore-print the fruiting-body should be placed, fertile (usually lower) surface down, on a piece of white paper, and unless the atmosphere is nearly saturated, covered with something such as an inverted tumbler or empty can that will prevent drying out of the specimen before spores have been deposited. If black paper is available, such as that in which photographic film is packed, a part of the specimens may be placed over white paper and part over black. The color of the spores can be learned (and should be noted from the fresh print) from the deposit on white paper; the black will show whether spores have been shed. A microscope slide will do as well as the paper. The spore-print is dried and filed with the specimen. If the weather is very wet, or if only a single specimen of a fleshy fungus is available, spore-printing may destroy the specimen, and it is then better to do without the print. Twenty-four hours should be time enough to secure a good print, if the material is going to yield one at all.

Most larger fungi, including nearly all Basidiomycetes, should be wrapped when gathered in pieces of newspaper, one collection to a packet. As soon as possible the packets should be opened and the specimens spread for drying, on a flat roof, table, or sandy area, if the atmosphere will dry the material, or above an artificial source of heat if that is necessary. Fleshy specimens need quick drying; woody ones are useful even if conditions for preparation are poor.

The jelly-fungi (Tremellales) may be ear-like and hairy on the sterile surface (Auricularia), jelly-like and translucent (Tremella), or only a mucous or gelatinous layer on a dead log (Sebacina). Spore-prints are desirable, but the basidia that produce the spores are of greater importance for subsequent study, and if the specimen is held a day for a spore-print and then too slowly dried the basidia may nearly all have discharged their spores and disintegrated by the time drying is complete. It is often better, therefore, to dry a part of a collection at once, and to use only a part for a spore-print. If the collection is small, or a choice must be made, it is better to secure immediate drying. If the heat is not so great as to kill the fungus by cooking, a well-dried specimen can often be revived months later and spores secured.

The genus Septobasidium produces lichen-like growths on living plant parts, usually twigs or smooth bark. A very interesting lavender-gray species has been found on Pandanus in the Marshalls; one should be sought on Citrus twigs. The fungus is usually felt-like in texture, and under the lens may show three layers in section-- a continuous basal layer in contact with the bark, a layer of pillars and air-spaces, and a continuous fruiting

surface-- all in a thickness of one or two millimeters. It is parasitic on scale-insects which in turn parasitize the host-plant; and any collection of Septobasidium therefore presents a triple problem in biogeography-- that of the host-plant, the insect, and the fungus. This should be dried like any similar fungus; specimens in preservative are also desirable.

Theleporaceae (and some Fungi Imperfecti which resemble them) and Hydnaceae may form films or sheets closely applied to the substratum (resupinate), or may be reflexed or occasionally free or even stalked. The last family is characterized by a tuberculate or toothed fruiting-surface, and the other groups by a more or less even one. Even the most delicate ones, which appear almost mold-like, are worth collecting; these should not be spore-printed unless quick drying is possible, or unless a part of the collection can be dried at once and a part sacrificed for the print. Unless the fructifications are stipitate, all should be collected with a slab or generous fragment of the substratum.

Polyporaceae may be shelf-like and leathery, fleshy, or woody, or may be resupinate like some of the groups earlier listed; all have a fruiting surface marked by pores. They are easily dried; the resupinate ones should be printed if possible, even if this necessitates first moistening the fructification or soaking the attached substratum.

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Agaricaceae, the gill-fungi, will be found both on dead wood and on the soil. Some are extremely fleshy and decay very very quickly, and for these the preparation of specimens will be a race between the drier and the processes of decay. The smaller, less fleshy species will retain their form and texture fairly well; but specimens of the larger species are usually worthless unless accompanied by notes showing color, attachment of gills to cap, and presence or absence of a ring around the stalk and a cup for membrane at the base. Color-notes are desirable for all. It is also desirable to make a median longitudinal section of one or two before drying.

Gasteromycetes, the puffballs and stinkhorns, will probably be rarely found, but are of considerable interest. Puffballs are worthless except for food unless the spore-mass within has taken on its characteristic deep color. Stinkhorns, which may have a simple columnar receptacle covered at the tip with a sticky greenish spore-mass, or may have a number of free or interwoven arms, are greatly sought by carrion flies, and may have to be sprinkled with formaldehyde before drying or put at once in preservative.

Rusts and smuts are rare on atoll plants. If found they should be treated like leaf-spots.

Lichens. As is generally known, these are compound structures composed of a weft of fungus threads in which are embedded algal cells. In moist areas they are quite common on trunks of trees--either crust-like