

CHOOSING YOUR FIRST MICROSCOPE

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Having now read your first issue of *Field Mycology* the need for a microscope in the accurate identification of fungi may have become apparent. Those keys to *Leccinum* and corticioid fungi rely on your having one. You may have reached the stage with your interest in fungi where you feel confident enough to identify (and even eat) quite a few mushrooms with the help of the photographs in Roger Phillips; but are you quite sure your *Clitopilus* isn't in fact an *Entoloma* - they both have pink spores? However competent you have become in translating the mystifying terminology in the descriptions, it cannot help you with spore shape, size or ornamentation. Perhaps that tiny bell-shaped thing on the plant stem isn't a cup fungus at all, maybe it is an agaric without gills, maybe a *Calyprella*? A quick glimpse of either an ascus or a basidium would help confirm this.

Comparison of photographs and descriptions are not enough. If you are to progress your identification skills and avoid embarrassing blunders, you do need a microscope. It will enable you to examine those features that are too small to be seen by the naked eye, many of them quite extraordinary and beautiful: such delights as spores, cystidia, clamp connections, hyphae, basidia and asci. These features are described in all but the simplest literature and provide clues vital to solving accurately the identification puzzle.

How to start looking.

It can be a daunting prospect making the first move to buy a microscope if you have no experience. You will be bombarded by new terms describing a bewildering range of technical features. The first step is to send off

for as many microscope brochures as possible from different suppliers (see page 68) and start reading. Although these may appear bewildering at first, some of the better catalogues are accompanied by glossaries which help you wade through the jargon. It really helps to familiarise yourself with this as much as possible. Prioritise the features you feel you need and which will fit your budget, stretching it to get the best quality you can afford.

Ask also for information on second-hand microscopes as there may be something available which will allow you extra features for your money. Ideally these need to be inspected first to check quality: that fittings are not loose or missing, that lens quality is acceptable and free from scratches affecting performance, that racking of barrel or stage is not worn and uneven and that there is no slippage of the stage causing objects to drift out of focus. It is obviously preferable if a full servicing has been undertaken prior to sale and that some form of guarantee is available.

If there is a microscope supplier within suitable distance a visit is always helpful, although these are often by arrangement only. Do not feel pressurised into buying just because you have arranged such a visit, especially if you know that the same or similar can be obtained more cheaply elsewhere through mail order. If possible contact your local fungus recording group who may have someone prepared to advise or even accompany you to the microscope supplier. Alternatively, come along to a BMS residential foray. People are friendly and helpful and once you have explained your needs you will probably be invited to look down many different instruments.

Features needed.

Your compound microscope will need to magnify specimens up to around $\times 400$ - certainly no less. This will be achieved with a $\times 10$ eyepiece lens and a $\times 40$ objective lens. A $\times 10$ objective lens is usually also recommended as a lower $\times 100$ magnification to conduct your initial search for the specimen on the slide. A $\times 100$ oil immersion objective lens is also very desirable as this will allow a magnification of up to 1000 times, maximising accuracy in measuring spores and other features. With oil immersion it is important to go for a good quality lens or the chances are you will merely be able to see a larger but more blurred image than with the $\times 40$ lens. Such lenses are not worth having as they will be disappointing and frustrate your progress. Ornamentations on *Russula* spores, not the easiest of things to differentiate under optimum conditions, will remain an indistinct mystery. If your budget is limited it is better to add or upgrade to a good quality oil immersion lens when you can afford it, so make sure your microscope has standard interchangeable fitments.

Objective lenses are screwed onto a rotating housing allowing easy change from one magnification to another. For convenience these should preferably be parfocal, this merely means that racking up and down to refocus is not required when swapping from one to another. Microscopes will either be monocular intended for use with one eye only, or binocular for use with both. The latter is preferable for ease of use but more expensive.

Microscope lighting offers another potentially confusing area for consumer choice. The most basic, cheapest of microscopes will not have an in-built light source. This necessitates your providing a suitable lamp of your own and spending time adjusting its position to optimise the illumination of your specimen. It is obviously far more convenient if you can afford it to opt for an in-built light especially if you cannot leave your microscope set up somewhere permanently.

Most microscopes have a mechanical stage which allows the glass slide to be clamped firmly and moved gradually but smoothly across the field of view. To measure spores

and other features an eyepiece micrometer or graticule will be needed. This may either be an eyepiece with permanent graduated fitting or a separate glass disc with a scale etched into it which can be fitted into the eyepiece lens and left in position. Both types have then to be calibrated for each objective lens using a stage micrometer. This normally only requires to be done once and help with this, loans of stage micrometers and other useful setting up tips can again often be gained through contact with a local recording group or at a BMS foray.

Be warned that your newly acquired microscope will cause expenditure both of time (lots) and money (some). After the initial expense there is the additional but slight cost of obtaining a regular supply of slides, cover slips, immersion oil and chemicals. And this will undoubtedly be accompanied by the desire for further books, including rather more expensive ones (£25 - £90 per volume) with keys to specialised groups of fungi. Fortunately however, one of the prime aims of this magazine is to provide such information at a fraction of this cost.

You will not become an expert overnight with the arrival of your first microscope but you will have taken a big leap forward to enable you to improve your identification skills. It will reveal to you an exciting new world of possibilities and introduce you to a very absorbing facet of mycology. (A list of suppliers and microscope clubs, along with information about local fungus groups, is given on page 68)

Additional reading

Dean, R. (1994) *I think I want a microscope.*

Newsletter of the North West Fungus Group.

Marriott, J.V.R. (1994). Guide to identification with a microscope. *Guides for the amateur mycologist*. B.M.S.

The BMS *Guide to identification with a microscope* is available from the BMS Librarian. Please send a cheque for £2.50 made payable to the BMS to: BMS Librarian, Valerie Barkham, Mycology Section, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE.