This issue of _Mycological Research News_ features: Confusion over _Amanita pantherina_ in Japan; Follicolous lichens are benign; A plethora of bryophilous niches; and A longevity gene in _Saccharomyces_.

Fast-tracked for publication in this issue is the description of another new species of pathogenic _Phytophthora_, attacking deciduous trees in Europe. Specific primers for the detection of _Pythium oligandrum_ in mushroom beds have been developed and tested. _Puccinia tanaceti_ is shown to be more host-restricted than supposed. Transformation systems for _Venturia inaequalis_ are compared, and the separation of _Fusarium_ species causing crown and head blight of cereals, and also of _Vorticillium dahliae_ and _V. tricorpus_ is described.

The genetic basis of _Aspergillus parasiticus_ strains that do not form aflatoxins has been explored, and large insert had been found in an aflatoxin-producing _A. flavus_ strain. Two genes involved in the early stage of melanin production in _Colletotrichum lagenarium_ are reported, and pairing tests in _Helocobasidium monpa_ show it to have a single incompatibility factor. Strategies adopted for growth in toxic metal environments have been studied and factors affecting growth determined. Conditions to optimise growth in entomophthoralean fungi have been explored, the coffee berry borer in Mexico has been found to support a wider range of fungi than hitherto expected, and a new _Monacrosporium_ able to trap nematodes as well as to parasitize fungal sclerotia has been discovered.

The following new scientific names are introduced in this part: _Monacrosporium janus_, and _Phytophthora pseudosyringiae_ spp. nov.

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**IN THIS ISSUE**

Fast-tracked in this issue is the description of another new species of _Phytophthora_ pathogenic to deciduous trees in Europe. This new fungus, _P. pseudosyringae_, is unusual in having semi-papillate caducous sporangia and is aggressive to beech and oak roots, holly leaves and apple fruits; molecularly it is most similar to _P. ilicis_ and _P. psychrophila_ rather than to _P. syringae_, the name previously but incorrectly applied to this pathogen (pp. 772–789). A diagnostic test based on species-specific primers has been developed for _Pythium oligandrum_, which causes ‘black compost’ in cultivated _Agaricus bisporus_ beds; this will facilitate the rapid diagnosis of this economically important disease (pp. 790–796). The rust _Puccinia tanaceti_ is reported from North America for the first time on introduced tansy; cross-inoculation experiments showed that the species was restricted to this host, and that it could not affect species in allied genera (pp. 797–802).

The development of methodologies for genetic transformations is fundamental to advances in many aspects of the control and exploitation of fungi. Two new transformation systems are described and their utility compared with respect to the plant pathogenic _Venturia inaequalis_: one mediated by polyethylene-glycol and acting on protoplasts, and the other using _Agrobacterium tumifaciens_ as a vector into mycelium, the latter being commended for simplicity and transformation efficiency (pp. 803–810). The precise identification of pathogenic _Fusarium_ species has advanced markedly in recent years through the application of molecular methods. Here, rDNA ITS sequences are utilized to improve the diagnosis of species causing crown rot and head blight of cereals, the trichothecene production _tris_ gene proved of particular importance, and the distinction of _F. pseudograminearum_ from _F. gramineum_ was corroborated (pp. 811–821). The separation of two other plant pathogens, _Verticillium dahliae_ and _V. tricorpus_, has often caused difficulties; here their separation is confirmed by cultural characteristics on a semi-selective modified soil extract medium, microsclerotial size, and molecular characters (pp. 822–830).

Four papers are concerned with aspects of fungal genetics, of which two relate to _Aspergillus_. Variants of _A. parasiticus_ which do not produce aflatoxins had the same regulator gene _afIR_ as ones which did, but expression was 5–10 fold lower; some other factors concerned with fungal development evidently influence the function of this gene (pp. 831–840). The DNA fingerprint patterns of aflatoxin-producing _A. flavus_ are polymorphic, and in clone pAF28 a 6355 bp insert has...
been sequenced and found to represent a transposable element of the gypsy class named here as AfRTL-1 (pp. 841–846). The genetics of the violet root rot fungus Helicobasidium mompa have been examined by a range of molecular markers in mycelial pairings; these failed to identify nuclear migration to opposite basidiospore isolates in all but one of 92 pairings attempted, suggesting a single mycelial incompatibility factor operates in single-spore isolates (pp. 847–853). The melanin synthesis pathway in the plant pathogenic Colletotrichum lagenarium has been studied in detail using a constructed double mutant, and two genes have been discovered to be involved in the first reduction step of melanin biosynthesis in this fungus, Thr1p and a deduced 1,3,6,8-tetrahydroxynaphthalene-specific reductase (pp. 854–860).

The ability of Clonostachys rosea and Trichoderma virens to grow in sites contaminated with the toxic metals cadmium and copper has been studied experimentally, and toxicity found to be ameliorated by an increased carbon source; the mycelia exhibited both ‘phalanx’ and ‘guerilla’ growth strategies to exploit such an adverse environment (pp. 861–871).

Finally, three papers are concerned with entomogenous or nematophagous fungi. Problems of bulk culture in vitro have limited the application of entomophthoralean fungi in biocontrol, but now enhanced growth of representatives of three genera has been achieved through the addition of vitamins, amino acids, and glucose (pp. 872–878). In a search for potential biocontrol agents, studies of the fungi associated with the coffee berry borer Hypothemus hampei in Mexico revealed 40 species, most of which were obtained from the cuticle; this is a major contribution to understanding the mycobiota of this pest, and yielded three undescribed species (pp. 879–887). A new nematode-trapping Monacrosporium species has been discovered parasitizing Sclerotinia sclerotiorum in China; it is an active predator of Panagrellus redivivus (pp. 888–894).

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CONFUSION OVER AMAHITA PANTHERINA IN JAPAN

In the review of Amanita muscaria and its toxins published in the February issue of this journal (Michelot & Melendez-Howell 2003), information on the allied A. pantherina and its products was included. New molecular and chemical studies on specimens identified as A. pantherina in Japan, however, have revealed that material from that country named as this species is a mixture of two fungi, A. pantherina and a second species newly described as A. ibotengutake (Oda et al. 2002). A. ibotengutake is the fungus known as ‘ibotengutake’ in Japanese but not previously given a scientific name, and after which ibotenic acid was named. The new species contains both ibotenic acid and muscinol and can be separated morphologically from other species in the A. muscaria complex. It differs from A. pantherina in the larger fruit bodies, ascending volval rings, a deciduous annulus, and also the presence of clamp connexions on hyphae and basidia. A. muscaria differs from the new species in the yellowish to reddish pileus, but A. regalis is similar to A. ibotengutake in having a brownish pileus but occurs in high mountain forests. All four species are clearly separated by ITS sequences. Mycologists need to be aware that chemical and other studies reported to have been conducted on A. pantherina from Japan could be based on either that species or A. ibotengutake. Where voucher material has been preserved, the identity of the fungus studied can be confirmed by checking for clamp connexions. At present A. ibotengutake is only known from mixed forests of Fagaceae or Pinaceae in Japan, but it would be prudent also to check the basis of reports from other regions.


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FOLIICOLOUS LICHENS ARE BENIGN

It has generally been assumed that lichens growing on tropical leaves, which can form mosaics over up to 100% of the surface area, adversely affect the hosts by reducing the photosynthetic activity (Rogers & Barnes 1986). However, no experimental data were available, although it has been suggested that lichen colonies are less harmful to tropical leaves than ones of the same algae in the non-lichenized state (Hawksworth 1988). Now, Anthony, Holtum & Jackes (2002) have studied the daily carbon gain in leaves of the palm Calamus australis and of the dicotyledonous tree Lindsayomytrus racemoideis in a tropical rainforest in Queensland. They examined the gaseous exchange and analyzed chlorophyll contents of fronds and leaves of different ages in relation to the occurrence of 11 lichenized fungi grouped into four categories on the basis of colour and morphology; the transmittance and reflectance of the lichens was also measured using a quantum sensor.
Studies were carried out in both the wet and dry seasons, on understorey leaves and ones in well-lit forest gaps, and when conditions were overcast and sunny. While the lichens showed mean light interception of 50%, with some reducing the photosynthetically usable light to 70%, this was fully compensated for by the leaves developing higher concentrations of chlorophyll under the lichens as compared to uncolonized areas of the leaves. No lichen thallus developed a thickness at which all light was stopped entering the leaf tissues. Moore (2003) speculates that the lichens not utilizing more of the incident light might be a trade-off between increasing lichen productivity and destroying the leaf that provides its habitat.

In view of the range of different conditions and number of species examined, and further the very different morphologies of the leaves involved, it seems probable that this is a general phenomenon. I.e. that foliicolous lichens, other superficial fungi, bryophytes, algae, and cyanobacteria that do not penetrate more than leaf cuticles and are thin enough to transmit some light, are benign. This conclusion is likely to be applicable to tropical crops such as coffee, tea, and oil palms as well as native rainforest trees, and suggests that attempts to eliminate superficial foliicolous organisms by plant pathologists in the interests of plant health are unnecessary. This situation would not be expected to apply in cases where fungal hyphae penetrate through the epidermis and disrupt the chlorophyll-containing cell layers within leaves.


Restrictions of calorie intake are well-recognized to promote longevity in a wide range of organisms, including mammals. In *Saccharomyces cerevisiae*, calorie restriction was found by Lin, Defossez & Guarente (2000) to require the NAD+-dependent histone deacetylase Sir2. That enzyme is strongly inhibited by the vitamin B3 precursor nicotinamide (Bittermann et al. 2002). Now, Anderson et al. (2003) have demonstrated that increased expression of the enzyme PNC1 (pyrazinomidase/nicotinamidase 1) is necessary for lifespan extension by calorie restriction. PNC1 acts as a longevity gene responsive to various stimuli that extend life-span. Nicotinamide depletion activated Sir2, and this was found to be the mechanism by which PNC1 regulates longevity. If nicotinamide is shown to have a parallel effect in other organisms, this elegant work could contribute to a greater understanding of the control of the ageing process.

