cross-react (*11*). The present observations suggest that luciferin from fishes and *Cypridina*, whether derived vicariously or synthesized independently, may be more widely distributed as a common substrate than heretofore believed.

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Schizophyllum commune: Gene Controlling Induced Haploid Fruiting

Abstract. *A single gene,* fis+, *is essential for induced haploid fruiting in* Schizophyllum commune. *It appears to segregate independently of the incompatibility factors.*

In tetrapolar Basidiomycetes, such as *Schizophyllum commune*, reproductive morphogenesis can be envisioned as consisting of two kinds of development. (i) The series of reactions—nuclear migration, formation of clamp-connections, synchronous nuclear division, and so forth—that establishes the dikaryon, and (ii) the maturative changes in the dikaryotic mycelium that culminate in meiosis and sporulation in the fruiting bodies. The process of dikaryosis and its control by the incompatibility factors have been studied extensively (*1*), but the cellular mechanisms that underlie the development of fruiting bodies in dikaryotic mycelia are largely unknown. It is also uncertain whether the incompatibility factors play an essential role in the fruiting process.

Although the formation of fruiting bodies normally occurs as a corollary of dikaryosis, fruiting structures may develop from haploid mycelia under certain circumstances (*2–4*). A recent study showed that haploid fruiting is inducible by an exogenous chemical agent or agents (*4*). The inducing factor was first isolated from mycelial extracts of the imperfect fungus *Hormodendrum cladosporoides* (*Cladosporium*) and was later obtained from fruiting bodies of *S. commune* and *Agaricus bisporus*. Methods of extraction, partial purification, and a biological assay were established for the inducing substance or substances.

An initial survey showed that very few homokaryons of *S. commune* would respond to the fruiting-inducing substance or substances (FIS). These observations raised the question as to the extent and nature of the genetic contribution to FIS-induced fruiting. We now report evidence of a single gene that functions in FIS-induction of haploid fruiting in *Schizophyllum commune*.

When an FIS-inducible strain was crossed with a compatible, noninducible homokaryon and a number of the resulting offspring were exposed to FIS, inducibility and noninducibility showed a 1:1 segregation ($P = .3$ to .5 in cross 1 of Table 1). Each monosporus mycelium was tested in triplicate, and the inducible cultures usually fruited by the 5th day after the application of FIS to the margins of the 4-day old colonies. The pattern of segregation indicated a single-gene difference among the two classes of progeny. The hypothesis of a single gene with two alleles, henceforth symbolized *fis*+ and *fis*−, was tested in three additional crosses (Table 1).

If neither of the mated strains carried the *fis*+ allele, none of the progeny would be expected to respond to FIS. On the other hand, when both compatible homokaryons possess the *fis*+ allele, all of their progeny would be expected to fruit following exposure to FIS. Both of these expectations were realized. Inducibility by FIS can thus be added to the several genetic factors previously demonstrated to be important in the expression of haploid fruiting in *S. commune* (*2*, *5*).

The *fis* gene has segregated independently of the incompatibility factors in all tests conducted thus far (for example, $P = .3$ to .5 in cross 1 of Table 1). It is thus possible in compatible crosses between FIS-inducible and FIS-noninducible homokaryons to associate the *fis*+ allele with the incompatibility factors in any desired combinations.

Table 1. Mode of inheritance of FIS-induced haploid fruiting.

Mated strains	Offspring tested (No.)	*fis*+	*fis*−
A41 B41 fis+ × *A51 B51 fis*−	84	38	46
A41 B41 fis+ × *A51 B51 fis*+	30	30	0
A41 B41 fis+ × *A43 B43 fis*+	30	30	0
A41 B41 fis− × *A51 B51 fis*−	20	0	20

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