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A highly fertile fluffy allele, fl^Y, which produces macroconidia.

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Abstract

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In 1964, the FGSC obtained a pale-yellow stock which was listed as ylo-3 (Y234M474) [FGSC no. 902]. The strain was deposited by Alan M. Kapular, with information that the mutant originated from wild-type 74A following UV treatment in experiments of T. Ishikawa at Yale University, that the locus did not show linkage to ylo-1 or ylo-2, and that cultures are slow to conidiate. Subden and Threlkeld (Can. J. Genet. Cytol. 10:351, 1986) included Y234M474 in a table with carotenoid mutants, where ylo-3 is listed as being in IIIR.

In our hands, Y234M474 maps at the locus of fl:fluffy in IIR. No wild-type recombinants were obtained among 207 progeny from Y2334M474 x fl^P. We propose to designate the Y234M474 allele fl^Y ("fluffy-yellow").

The previously known fl alleles do not normally produce macroconidia (although some may be induced to conidiate sparingly with special media). The new fl^Y allele regularly produces macroconidia on minimal synthetic cross medium (SC) or Vogel's minimal, with sucrose as carbon source, but conidia are seen only several days after fl^+ controls have conidiated, and in lower numbers. Conidiation of fl^Y was not enhanced on the conidiogenic medium of Turian (1964 Nature 202:1240). No difficulty was experienced in classifying progeny of a fl^Y x fl^P cross in 12 x 175 mm minimal slants (34°) after the cultures had been held long enough for conidiation to occur.

The color of fl^Y depends on temperature of incubation during growth and conidiation. Conidia and mycelia were both yellow when growth was at 34°, but they were orange when growth was at 25° and 38°, on minimal and on complete medium in 150 mm slants. Cultures may either be grown in a lighted incubator or grown in the dark and then brought into a lighted room for induction of carotenoids. It is not unusual for morphological mutants at other loci to appear yellowish rather than orange or to have carotenoid synthesis attenuated so that the mutant appears paler than wild type.

It should be noted that the hue and intensity of carotenoids in mutants and in wild type can appear quite different when they are viewed in natural daylight compared to artificial light. Carotenoid mutants remain distinguishable under both conditions, however, although they may be more distinct in one than the other. We routinely examine cultures in a laboratory illuminated with white fluorescent lights.

fl^Y behaves like other fluffy alleles in producing microconidia profusely when combined as a double mutant with dn (dingy). Slant cultures of fl^Y; dn appear grey-brown after microconidia are produced. No orange or yellow macroconidia are visible to the naked eye. fl^Y; dn has not been examined microscopically for macroconidia. Presumably pe fl^Y would resemble fl^Y; dn.

Vegetative growth of fl^Y is vigorous. Linear growth on race tubes is similar to that of Oak Ridge wild type (3.8 mm/h on minimal medium at 25° C). Morphology of young cultures resembles other fluffy alleles such as fl^L and fl^P.

Strains of fl^Y are extremely fertile. Perithecia may be visible four days after opposite mating types are inoculated together onto slants of synthetic cross medium (SC) in 150 mm tubes at 25°C. As with fl^P, 4-day old fl^Y slants can be stored at 5° for at least two weeks while retaining full fertility.

Our laboratory has long used fl^P A and fl^P a as standard testers on 12 x 75 mm SC slants to determine the mating type and chromosome sequence of progeny from crosses, to detect new chromosome rearrangements, to score Spore killer genes, and to determine the species of wild-collected Neurospora isolates. We had hoped that fl^Y might prove superior to fl^P and other fluffy alleles as a tester, because it would let us inoculate large numbers of tubes with a conidial suspension. (With the nonconidiating fluffy alleles, we inoculate them with a suspension of small particles of macerated mycelia, which is more work to prepare.) However, we found that the production of conidia by fl^Y, even though delayed, sometimes impedes observation and interferes with scoring. A more serious disadvantage is that large protoperithecia ("false perithecia") are sometimes produced in unfertilized single-mating-type cultures of f1^Y. These could be mistaken for young perithecia or for barren perithecia and could lead to false readings for mating type and for fertility. False perithecia can be a major problem when duplication-generating rearrangements are being analyzed, because Duplication strains characteristically produced barren perithecia in test crosses (Perkins and Barry 1977, Adv. Genet. 19:133-285). (False perithecia also occur occasionally in some fl^P strains, but not in those we have selected as testers.)

Thus fl^Y is less useful than fl^P for our purposes. It might, however, be useful to others in studies of regulation and development.

Strains fl^Y A (FGSC 4240) and fl^Y a (FGSC 4241) have been deposited in FGSC. These are progeny from backcrosses of the original strain Y234M474 to OR wild type. --- Department of Biological Sciences, Stanford University, Stanford, CA 94305