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# Resistance to surface active drugs of wild type strains and newly isolated mutants of *Neurospora crassa*.

## **Abstract**

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Resistance to surface active drugs of wild type strains and newly isolated mutants of *Neurospora crassa*.

Surfactant-resistant mutants of *Neurospora crassa* were isolated following UV irradiation of *cot* (C102, mating type a) by a single step selection. These surfactants were dequalinium chloride, cetyltrimethyl ammonium bromide and bensalkinium chloride. Three nuclear genes for surfactant resistance were identified. These genes are designated surfactant resistant - 1 (*sar-1*), *sar-2*, and *sar-3*.

Mutants of the three genes differed in their responses to the surfactants both in their growth characteristics and their resistance specificities. *sar-1* and *sar-3* are closely linked to mating type on linkage group I, whereas *sar-2* is not yet located but segregates independently of *sar-1* and *sar-3*. When transferred to plates containing Vogel's minimal medium supplemented with drugs, all of the resistant mutants show a lag phase of very slow non-adapted growth during which deformed hyphae and hyphal leakage occurs. Following this lag phase, fully adapted drug resistant growth is established. The morphology of the mutants on drug-supplemented medium indicates that changes in the cytoplasmic membrane might be necessary before the resistant phenotype develops.

Two laboratory wild type strains were also studied for resistance to these same three surface active agents. A gene located in linkage group I that confers resistance to some surface active drugs was found in the wild type Em A f.1534 (obtained from B. R. Smith), but not in Em a f.1535 (obtained from B. R. Smith); this gene was designated *sar-1*. In an attempt to determine the origin of the *sar-1* allele, a number of antecedents of the wild type Em A f.1534 were tested for resistance to the above mentioned surfactants. The *sar-1* allele of Em A f.1534 is closely linked to mating type (Table I), which is clear when the pedigree is examined (Figure 1). The Emerson wild type (Em 5256 A), Abbott 4 (FGSC 1757) was almost certainly the source of this allele. The resistant pattern shown by the Lindegre wild type strains 25a (FGSC 353) and IA (FGSC 354) are similar to that of the Emerson Em 5256 A strain. However more studies are needed to be sure that these strains carry authentic *sar-1* alleles. The sensitive *sar-1*<sup>+</sup> allele clearly originally came from Abbott 12a (FGSC 1758) strain.

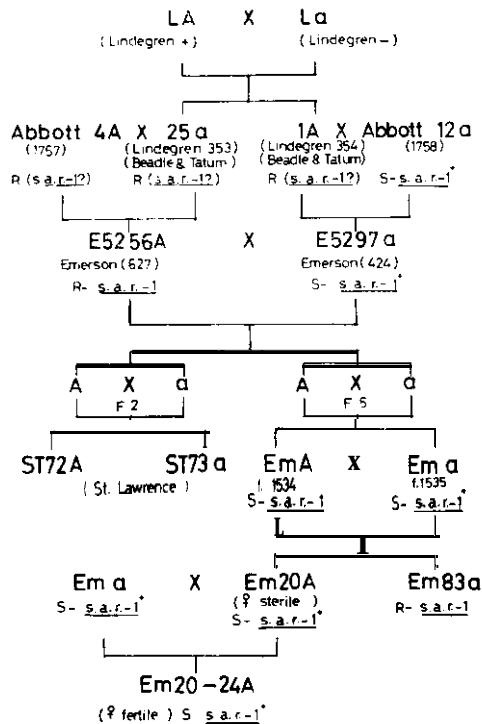


Figure 1. -- Pedigree showing the resistance of the different laboratory wild types to the three mentioned surfactants. S = sensitive and R = resistant. Stock numbers shown in brackets are those of the Fungal Genetics Stock Center. Em A f. 1534 and Em a f. 1535 were provided by B. R. Smith.

TABLE 1

Random spore analysis of cross between drug resistant and drug sensitive wild types

Cross	Progeny			Progeny Ratios		
	CTAB	m.t.	NO.	A : a	R : S	Par. : Recomb.
Emf. 1535 X EmA f. 1534	S	a	92	77:101 $\chi^2=3.24$ $P>0.05$	82:96 $\chi^2=1.1$ $P>0.2$	165:13 Linkage between m.t. and R is 7.3 map units
	R	A	73			
	S	A	4			
	R	a	9			