

STUDIES ON SEXUALITY IN HIGHER FUNGI:

IV HEXAGONIA POLYGRAMMA MONT.

Several workers have worked in detail on the sexuality of higher fungi. Whitehouse (1959) and Raper (1966) have reviewed in detail the available works in this line. In India, Bose (1934), Banerjee (1956), Banerjee *et al.* (1954, 1955, 1957, 1958, 1959, 1964), and Samajpati (1968) have worked on this phenomenon in higher Basidiomycetes.

All the isolates of *Hexagonia polygramma* Mont from different regions of infected wood of *Ziziphus mauritiana* Lamk. (Plum). On examination, the mycelia have revealed the presence of abundant clamp-connexions. This indicates that the pathogen in question may be a 'heterothallic' one. In order to substantiate this statement and nature of sexuality existing in this species, mating experiments have been undertaken.

Thirty monosporous cultures have been made on 2.5 percent malt agar (pH 6.0) from spore-deposits obtained from a single basidiocarp of *H. polygramma* growing on *Z. mauritiana* following the usual dilution method (Smith, 1954). After careful microscopic observations, 25 cultures have been found to be without clamp-connexions and as such they are in the monokaryophasic condition. Of these, 20 cultures have been selected for this purpose and serially numbered. They have then been paired in all possible combinations in 2.5 per cent malt agar slants and incubated at 30°C. in complete darkness for 21 days. The interacting mycelia in some cases fused completely with each other forming a homogeneous mat, in others they have touched each other showing the line of contact, while in rest a space of aversion is present in between the two pairing mycelia. Inocula have been taken from the middle region of all the cultures and examined microscopically for the presence of clamp-connexion. These cultures which have shown the presence of clamp-connexion when subcultured have yielded typical dikaryophasic mycelia of *H. polygramma*.

The results of pairing have been tabulated in the Text-fig. 1, (+) sign indicates the presence of clamp-connexion and (—) sign their absence.

From the data (Text-fig. 1) it is evident that *H. polygramma* is a 'heterothallic' and sexually 'tetrapolar' species. The dikaryophasic mycelia with typical clamp-connexions agree in all respects to those of the mycelia of polysporous origin and isolates from the decayed wood in nature.

	AB					Ab				aB				ab						
	1	2	4	5	6	3	7	9	10	8	11	12	15	13	14	16	17	18	19	20
AB	1	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+
	2	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+
	4	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+
	5	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+
	6	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+
	3	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-
Ab	7	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
	9	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
	8	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
aB	11	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
	15	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-
	13	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ab	14	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Text-fig. 1. Graph showing the mating results of 20 monokaryophasic mycelia derived from a single basidiocarp of *H. polygramma*. (+)=Presence of clamp-connexions; (-)=Absence of clamp-connexions. AB, Ab, aB, & ab representing the four different mating types of the monokaryophasic mycelia.

The mycelia are represented in four groups, viz., AB, ab, Ab and aB due to their different genetic constitutions. The pairing takes place only between the compatible mating types (AB X ab and Ab X aB) and form dikaryophasic mycelia in the restoration of the heterozygote (AaBb) in the synkaryon of the basidium.

The following three main types of reactions have been observed due to interactions of the interacting mycelia :

(a) *Compatible*—Two monokaryophasic mycelia intermingle freely and eventually lose their identity. There is also no line of demarcation between the two mating monokaryophasic cultures and the agar medium is not discoloured below the place of contact. Clamp-connexions, however, have been seen in all cases.

(b) *Antagonistic*—In this case two monokaryophasic mycelia meet to form a distinct line separating the narrow space of aversion has been noted. A dark zone is formed in the agar medium just below the separating line. No clamp-connexions are found in these cases.

(c) *Neutral*—Two pairing mycelia intermingle with one another and form a homogeneous mat. Dikaryophasic mycelium with clamp-connexions has not been observed.

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