

Interference studies in *Neurospora crassa* and *N. sitophila*

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Tetrad data from five-point crosses involving linkage group I (mating-type chromosome) and three-point crosses involving linkage groups VI and VII of *Neurospora crassa* and *N. sitophila* have been analysed in order to detect the phenomena of chromatid and chiasma interference on a comparative basis. Marker genes were transferred from *N. crassa* to *N. sitophila* by hybridization and repeated back-

Table 1. Data on chromatid interference across the centromere of linkage group I of *Neurospora crassa* and *N. sitophila*

Intervals	<i>mt</i> ⁺		<i>arg-3</i>		<i>cr</i>		<i>al-2</i>		<i>nic-1</i>		χ^2
	<i>mt</i> ⁻	I	+	II	III	+	IV	+	V	+	
	Total asci	Map distances		Frequency			2-str.	3-str.	4-str.		
<i>N. crassa</i>											
I & III	334	13; 11.3		9	11	5					
I & IV	334	13; 32.5		5	13	4					
I & V	334	13; 11.5		0	1	1					
II & III	334	6.2; 11.3		6	4	0					
II & IV	334	6.2; 32.5		6	6	0					
II & V	334	6.2; 11.5		1	3	0					
		Total		27	38	10					7.6*
<i>N. sitophila</i>											
I & III	332	35.5; 30.4		31	62	30					
I & IV	332	35.5; 43		15	26	8					
I & V	332	35.5; 14		0	3	1					
II & III	332	5.7; 30.4		12	7	5					8.3*
II & IV	332	5.7; 43		1	4	3					
II & V	332	5.7; 14		0	2	0					
		Total		59	104	47					

* Significant departure from expected ratio of 1:2:1.

crossing. The details of the methods of transfer and of making crosses have been described in a previous paper (Scott-Emuakpor, 1965).

Summaries of the data on chromatid interference in the various linkage groups studied are shown in the accompanying tables. An indication of negative chromatid interference was observed across the centromere of the mating-type chromosomes of the two species. A significant excess of three-strand double crossovers was

Table 2. Chromatid interference within arms of linkage group I of *Neurospora crassa* and *N. sitophila*

Intervals	Total asci	Map distance	Frequency					Total 2-str. & 4-str.	χ^2
			2-str.	3-str.	4-str.	2-str. or 4-str.	2-str. & 4-str.		
<i>N. crassa</i>									
I & II	334	13; 6.2	4	7	5	5	14		
III & IV	334	11.3; 32.5	10	14	7	2	19		
III & V	334	11.3; 11.5	6	2	2	1	9		
IV & V	334	32.5; 11.5	3	16	9	0	12		
		Total	23	39	23	8	54		
<i>N. sitophila</i>									
I & II	332	35.5; 5.7	1	14	2	1	4		
III & IV	332	30.4; 43	19	82	23	11	53	6.2*	
III & V	332	30.4; 14	7	13	1	2	10		
IV & V	332	43; 14	13	19	13	0	26		
		Total	40	128	39	14	93	5.4*	
Whole chromosome									
<i>N. crassa</i>			50	77	33	8	91		
<i>N. sitophila</i>			99	232	86	14	199		

* Significant departure from expected 1:1 ratio for 3-str. and 2-str. plus 4-str.

Table 3. Data on chromatid interference in linkage group VI

Intervals	Total asci	Map distance	Frequency		
			2-str.	3-str.	4-str.
<i>N. crassa</i>					
I & II	273	39; 4.9	3	3	2
I & III	273	39; 4.5	3	2	3
II & III	273	4.9; 4.5	3	1	0
		Total	9	6	5
<i>N. sitophila</i>					
I & II	271	27.5; 3.3	2	3	1
I & III	271	27.5; 0.9	1	0	1
II & III	271	3.3; 0.9	1	0	0
		Total	4	3	2

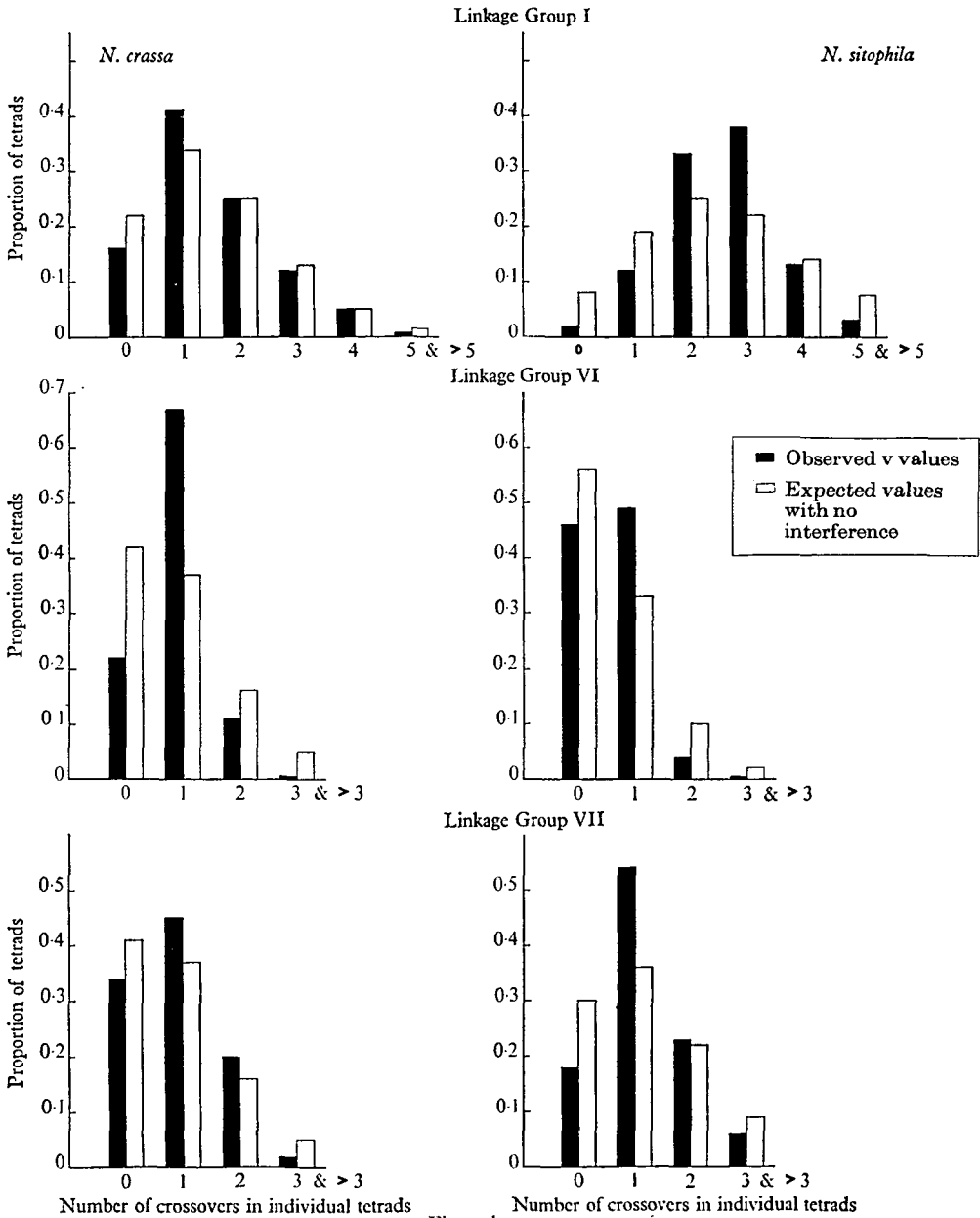


Figure 1

Fig. 1. Chiasma interference as shown by the distribution of crossovers among tetrads from crosses involving linkage groups I, VI and VII of *Neurospora crassa* and *N. sitophila*. Solid bars represent observed values of tetrad classes and open bars values expected on the Poisson distribution.

found within arms of the mating-type chromosome of *N. sitophila*. In view of the close linkage of marker genes in the centric regions of linkage groups VI and VII of the two species, the number of tetrads giving information on chromatid interference is small.

Table 4. Data on chromatid interference in linkage group VII

Intervals	Total asci	Map distance	Frequency				Total 2-str. & 4-str.
			2-str.	3-str.	4-str.	4-str.	
<i>N. crassa</i>							
I & II	314	20.6; 2.2	3	3	0	—	3
I & III	314	20.6; 22	11	33	7	—	18
II & III	314	2.2; 22	1	4	0	3	4
		Total	15	40	7	3	25
<i>N. sitophila</i>							
I & II	317	23.1; 2.5	8	5	0	—	8
I & III	317	23.1; 33	18	32	12	—	30
II & III	317	2.5; 33	1	7	0	5	6
		Total	27	44	12	5	44

Chiasma interference was found as usual to be positive within arms in both species. In Fig. 1, observed values of tetrad classes are compared with values expected at random, on the Poisson distribution, for crossovers falling in the entire region between *mt* and *nic-1*, *ad-8* and *pan-2*, and *nic-3* and *arg-10* in linkage groups I, VI and VII respectively. In linkage group I, whereas a significant excess of single crossover tetrads was observed in *N. crassa*, a preponderance of triple crossover tetrads was indicated in *N. sitophila*.

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REFERENCE

- SCOTT-EMUAKPOR, M. B. (1965). Genetic recombination in *Neurospora crassa* and *N. sitophila*. *Genet. Res.* **6**, 216–225.