Thomas, D.Y. and L.C. Frost. Temperature and fertility of wild-types in Neurosporo.

McNelly-Ingle ond Frost (1965 J. gen. Microbiol. 39:33) showed that the Lindegren, Abbott, Chilton and recently isolated Costa Rican strains of Neurosporo differed in the range of temperatures over which protoperithecia were produced. The overall range was 15° to 30°C., no strain tested producing protoperithecio at 10° or 35°. In the present study, observations were made on 15 wild strains of Neurosporo. Replicated plate cultures were used with the edges of the agar (Westergaard and Mitchell medium) cut away to give a square not in contact with the edges of the dish. The variation noted by McNelly-Ingle and Frost was again apparent (Table 1). Four strains which consistently produced protoperithecia at 30° were tested at 32.5°. Costa Rico 205A consistently produced apparently normal protoperithecia at this temperature while Costa Rica 205a, Liberia 4A and Fiji N6-1a occasionally produced protoperithecia. However, in all cases these protoperithecia could not be fertilized-by conidia of the other wild strains at 32.5°.

Table 1. The range of temperatures over which protoperithecia were produced by wild-type stmins of Neurosporo spp.

Wild-type strain	Obtained from	Temperature 15°	17.5°	25°	27.5°	30°
Lindegren 1A	Beadle and	+	+	+	+	+
Lindegren 25a	Tatum	+	+	+	+	+
N. sitophila A	Ramsbottom and	+	+	+	+	-
N. sitophila a	Stephens	+	+	+	+	-
Costa Rico 205A	FGSC	•	▫	▫	▫	▫
Costa Rica 205a	FGSC	+	+	+	+	±
Costa Rico CU8a	E. Evans	-	-	+	±	±
Puerto Rico 18a	FGSC	+	+	+	+	+
Honduras a	C. Curtis	-	(±)	-	(±)	-
North Africa 1A	FGSC	+	+	+	+	+
Liberia, 4A	FGSC	±	±	±	±	±
Sydney a	P. Valder	•	▫	▫	+	+
Singapore 2a	FGSC	±	+	+	+	+
Fiji N6-1a	FGSC	•	▫	▫	▫	▫
Jom a	FGSC	±	▫	•	▫	▫

Protoperithecia produced: + = consistently, ± = occasionally, (±) = occasionally and abortive, - = never.

Counts of protoperithecial frequency in typical unit areas of the plates were mode 7 days after inoculation, irrespective of tempemture. These counts indicated that some strains, but not others, showed two marked peaks of protoperithecial frequency in relation to tempemture. Costa Rica 205a, Puerto Rim 18a, Honduras a and Singapore 2a showed peaks ot 17.5° and 27.5° while Fiji N6-1a showed peaks at 17.5" and 30°.

Fertility between the wild strains was tested by reciprocal pair-wire crosses in test tubes and by the more rapid method of loop-streaking dense conidiol suspensions of two different wild-types on opposite margins of cut-away plate cultures with 7-day-old proto-perithecio of a third strain. Fertility was measured on the plates by the frequency per unit area of perithecio with normally developed necks (since perithecia with undeveloped necks were found to be devoid of viable spores) and the percentage of block oxospores of normal size and shape in a sample of crushed fertile perithecio.

The results showed that conidia of 5 different wild strains tested over the range 15-30° against Honduras a acting as protoperithecial parent were sterile whereas the latter as conidiol parent was fertile with Lindegren 1A, Costa Rico 205A, North Africa IA and Liberia 4A. Liberia 4A and Costa Rica-CU8a also were predominantly sterile as protoperithecio? parent when tested against several of the wild strains.

Sidney a, isolated from a loaf of bread in Sydney, Australia, differed from typical N. crassa or N. sito hila N. sitophila producing, on a variety of media, brilliant yellowish-orange conidia in oggregoted clumps. It was for more fertile with fertile wi Lindegren 1A (68% normal ascospores) than with N. sitophila A (35% normal ascospores).

The Costa Rican, Puerto Rican and Lindegren strains all inter-crossed with high fertility, particularly over the range 25-30°. However, Honduras a showed its greatest fertility with Liberia 4A, notably at 25°. The latter was highly fertile with Java a, particularly at 27.5°, but not with the other strains from the Pacific area. North Africa 1A was more fertile, especially at the higher temperatures, with Singapore 2a than with the Caribbean stmins while Fiji N6-1a was more fertile, notably at 17.50, with Lindegren 1A than with the Caribbean or African strains. These patterns of inter-strain fertility suggest that wild populations of Neurospora moy show geographical diversity with a tendancy for fertility barriers to arise between geographically isolated populations.

• • • Genetics Laboratory, Department of Botany, University of Bristol.