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Neurospora alcoy linkage tester stocks with group VII marked, and their use for mapping translocations

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Abstract

The original *alcoy* strains *(T(I;II)4637 al-1; T(IV;V)R2355, cot-1; T(III;VI)1, ylo-1*. Perkins et al. 1969 Genetica 40:247-278) contain three unlinked translocations tagged with markers that can be conveniently scored by inspection, without transfer. Linkage group VII is not involved in any of the translocations and was not marked. Failure to show linkage to an alcoy marker implied that the unknown was either in linkage group VII or was far removed from a marker in one of the marked groups, I-VI.

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The original *alcoy* strains (*T(I;II)4637 al-1; T(IV;V)R2355, cot-1; T(III;VI)1, ylo-1*. Perkins et al. 1969 Genetica 40:247-278) contain three unlinked translocations tagged with markers that can be conveniently scored by inspection, without transfer. Linkage group VII is not involved in any of the translocations and was not marked. Failure to show linkage to an alcoy marker implied that the unknown was either in linkage group VII or was far removed from a marker in one of the marked groups, I-VI.

To increase efficiency, a VII marker, conidial separation-2 (*csp-2*), was introduced into *alcoy* by Perkins and Björkman (1979 Neurospora Newsl. 26:9-10). *csp-2* is scored by a simple tap-test. Because our report was part of an inconspicuous note, some labs have apparently remained unaware that the new version of alcoy is available and have continued using the less efficient originals.

We have found *alcoy;csp-2* useful not only for locating point mutants but also for determining the linkages of translocations with distal breakpoints. Before any mapping is done of a newly identified translocation we routinely determine patterns of defective ascospore in shot, unordered asci. This indicates the type of translocation, whether reciprocal or duplication-producing (Perkins 1974 Genetics 77:459-489; Perkins and Barry 1977, Adv. Genet. 19:133-285). It also tells us whether breakpoints are near centromeres or are far removed. Translocations with breakpoints closely linked to centromeres are mapped by crossing with a multicent tester (Perkins 1990 Fungal Genet. Newsl. 36:31-32). Translocations with one or both breakpoints not close to centromeres are crossed to *alcoy;csp-2*, and progeny are examined for linkage between two of the *alcoy* markers. When *alcoy;csp-2* is used, three of the 21 possible breakpoint combinations will go undetected because they coincide with the three *alcoy* translocations. Breakpoints in chromosome arms opposite those marked in *alcoy* may also not be detected. Nevertheless, the success rate has been good in a small sample of translocations tested with *alcoy;csp-2*.

Except for VII, each *alcoy* marker tags two linkage groups. When linkage is shown to one of these *alcoy* markers, a follow-up cross is required to determine which of the alternatives is correct. For mapping a point mutant, normal-sequence follow-up testers are used that have markers in the two groups in question. With an unmapped translocation, if linkage is shown between two alcoy markers in the cross by *alcoy;csp-2*, the normal- sequence follow-up testers must have four linkage groups marked unless one of the markers is *csp-2*.

A complete set of normal-sequence follow-up testers is available from the Fungal Genetics Stock Center, listed in section VII A 1 of the catalog. Triply marked follow-up testers incorporating *csp-2* are recent additions. The latter are suitable either for translocations or for point mutants that show *csp-2* linkage in crosses to *alcoy;csp-2*. With point mutants, one marker in the triply marked tester will be superfluous and can simply be ignored.

FGSC numbers of the linkage testers with *csp-2* are as follows:

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alcoy; csp-2        3661 (A)  3434 (a)
T(I;II); T(IV;V);

T(III;VI); VII
al-1; arg-5; csp-2  6664 (A)  6665 (a)  I; II; VII
cot-1; al-3; csp-2  6666 (A)  6667 (a)  IV; V; VII
trp-1; ylo-1; csp-2 6680 (A)  6681 (a)  III; VI; VII
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