SHORT NOTE

TESTING FOR PARENT × MATING TYPE INTERACTION BETWEEN SELF- AND HALF-SIB FAMILIES

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ABSTRACT

An amended and slightly extended solution is given for the sum of squares for parent × mating type interaction (cf BURDON & RUSSEL, *Forest Genetics* **5**: 179–190, 1998).

The statistical analysis of data from selfing experiments has been addressed, within a framework of analysis of variance, by BURDON & RUSSELL (1998). We have since found that our proposed solutions for the sum of squares for the interaction between mating type ('treatment') and seed parent ($_{Ssft}$), while evidently satisfactory for the case of zero interaction, are not correct in the presence of interaction. Accordingly, while offer a solution that supersedes Equations 22–25 (*op. cit.*). It is also more general with respect to experimental layout.

The solution is, using the previous notation (*op. cit.*):

$$\begin{aligned} SS_{ft} &= n\sum [[1.5(Y_{io.} - Y_{.o.}) - 0.75(Y_{is.} - Y_{.s.})]^2/2] - [[(f-1)/2][(1.5^2-1)MS_{efo} + (0.75^2 - MS_{efs}]] \\ &= n\sum [[1.5(\hat{f}_{io}) - 0.75(\hat{f}_{is})]^2/2] - [[(f-1)/2][(1.5^2-1)MS_{efo} + (0.75^2-1)MS_{efs}]] \end{aligned} \quad [1]$$

where MS_{efo} and MS_{efs} are the effective error mean squares against which outcross- (polycross) and self-families are tested respectively (BURDON & RUSSELL, Table 1).

It has been confirmed (RUSSELL *et al.* in MS) that this solution leads to estimates of the interaction variance that generally fit closely with the relationship (BURDON 1977)

$$\sigma_f^2/(\sigma_f^2 + \sigma_{ft}^2) = r_g \quad [2]$$

where r_g in this case represents the genetic correlation between the performance as polycross- and self-families respectively (BURDON & RUSSELL 1998). Depending on the data properties, however, some minor discrepancies can readily arise between parameter estimates representing tie two sides of this equation but these discrepancies are typically small in relation to the inherent imprecision of the statistics. By introducing the error mean squares in the second term of Equation 1, which corrects for bias, the expression is generalised with respect to type of balanced experimental layout.

The mean square for interaction therefore also gives a satisfactory test for general departures, in the population, from zero inbreeding depression overall. A strong case could be made for using one-tailed tests, unless there was reason to believe that there were some genuine cases of negative inbreeding depression.

REFERENCES

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