Interspecific Hybridization of *Melilotus alba* x *M. Officinalis* Using Embryo Culture

G. T. Webster

SWEETCLOVER breeders have been striving for several years to develop productive strains which are free from or relatively low in coumarin. Following Smith's (8) successful transfer of genes for low coumarin content from *Melilotus dentata* to white sweetclover, *M. alba*, more rapid progress has been made toward this goal. The resulting low coumarin strains are all of the *M. alba* type, whereas there is considerable evidence that varieties of the yellow-flowered species, *M. officinalis*, are more drought tolerant and better adapted over much of the Great Plains Region.

Selection within strains and varieties of *M. officinalis* has failed to produce plants which are low enough in coumarin to be of use in a breeding program. Efforts to introduce genes for low coumarin directly from *M. dentata* have not been successful, since this species and *M. officinalis* appear to be completely incompatible even though their chromosome numbers are the same. Reciprocal crosses between *M. officinalis* and *M. alba* frequently result in a stimulation of ovule development, although viable seed from this cross has never been reported. Abortion of the ovules usually becomes evident within 8 to 10 days after pollination, and decomposition sets in by the 14th to the 15th day.

Examination of these ovules frequently revealed embryos which have become well developed before collapse occurs. It therefore appeared evident that low coumarin strains of *M. alba* might be successfully hybridized with *M. officinalis* through the use of embryo culture. Since success in the use of this technique with sweetclover has not been reported, a study of methods and nutrient materials was undertaken. A recent review of the literature pertaining to this subject was reported by Keim (4).

**MATERIALS AND METHODS**

The first medium to be used was basically a nutrient solution which Parkey (3) found to be satisfactory in culturing buffalograss embryos. The stock salt mixture is as follows:

- KCl 10.0 gm.
- CaSO$_4$.2H$_2$O 2.5 gm.
- MgSO$_4$.7H$_2$O 2.5 gm.
- Ca$_3$(PO$_4$)$_2$ 2.5 gm.
- FePO$_4$ 2.5 gm.
- NH$_4$NO$_3$ 2.5 gm.