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Comment

Dry matter content in cassava and interspecific hybridization

Comment on the article of H. Ojulong, M. Labuschangne, L. Herselman and M. Fregene [Introgression of genes for dry matter content from wild cassava species (Euphytica 2008 Apr 2; 164 (1): 163-172. Doi 10.1007/s10681-008-9685-6)].

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This particular paper gives an account of using interspecific hybridization within the genus of cassava (*Manihot* spp). It is worthwhile trying interspecific hybridization with cassava. Its wild relatives possess valuable genes for improving the crop, but they have been neglected in the past (Nassar, 2003a,b, 2006c). However, this task is difficult. Interspecific barriers, hybrid sterility, and severe seed dormancy are some obstacles, among others. This comment may be useful to both readers and the authors.

1. Frequently, cassava is pollinated by tiny insects of Coleoptera (Nassar, 2006b, 2007; Nassar et al., 2008a). Because of their very small size, they can enter the sacs that protect cassava panicles. It would seem to the readers that this fact did not receive sufficient attention. Interspecific hybridization with cassava has been explored as in the case of other crops where there is no problem with these insects. Because of this obstacle, we normally manage it by using gene markers and by using wild species as maternal parent since they possess recessive genes (Nassar, 2003c, 2004; Nassar and Collevatti, 2005). There are many morphological gene markers presented in the photo gallery section of <http://www.geneconserve.pro.br/>. It may be useful visiting this page. Only in the case of using gene markers can one trust that in-

terspecific hybridization has occurred (Nassar, 2000, 2006a). Gene markers must be reported in such study. Their photographs must also be presented. *Manihot pseudoglaziovii*, which is reported to have been used as a parent, exhibits moderate barriers between it and cassava, so there is the possibility of these progeny being no more than the result of self-pollination within cassava plants. It is likely that protection of the sacs did not impede these tiny pollinating insects of Coleoptera from pollinating cassava.

2. *Manihot pseudoglaziovii* exhibits severe seed dormancy (Nassar, 2000; Nassar and Ortiz, 2008). If *M. pseudoglaziovii* is used as maternal parent, as explained above, progeny seed will show severe dormancy, and it will be very difficult to grow progeny unless dormancy is broken (Nassar, 2006b, 2007a). It is noted that there is no mention of breaking dormancy in the article. Available literature (Nassar 2007b,c; Nassar et al., 2008b; Nassar and Ortiz, 2008) refers to the importance of breaking dormancy to grow progeny of interspecific hybrids.

3. As explained above, *M. pseudoglaziovii* exhibits moderate barriers between it and cassava. Trials to break these barriers should be conducted. Some methods have been used and proven to be efficient in overcoming these barriers (Nassar, 1999). This factor is really an important one. It may puzzle those familiar with interspecific hybridization why crosses are made without considering it. Normally, new trials are recommended using one of the methods mentioned in the above literature.

4. There are many wild species of *Manihot*, almost 100 (considering the new species described in the last years). Many materials used by some breeders are no more than escapees, no more than weeds. They do work well as a source of certain useful genes, but not genes normally donated by the wild progenitor. Therefore, a precise classification and description must be carried out by an expert in this field. The material should be photographed and described. Both photographs and description must be included in the article. This will guarantee the reader a good understanding of the material used in the experiment.

5. *Manihot tristis* is a questionable species, as has been raised by Rogers and Appan (1973). It is probably no more than a scape of cassava or an extreme segregation of it. In this case, the hybridization that was made is no more than crosses within the cassava gene pool itself (Rogers and Appan, 1973; Nassar, 2006b; Nassar and Ortiz, 2008; Nassar et al., 2008b).

6. Increasing dry matter content does not mean increasing starch content. Since crosses dealt with wild species, it is likely that what was increased was fiber content!! Fiber and starch are the principal components of dry matter in cassava root. Readers would have a better idea if starch and fiber contents were estimated separately in the selected introgressed root. HCN content is also an aspect that should be considered. This would have been expected to be astronomically increased, because HCN content of *M. tristis* is more than 1000 mg/kg (Nassar and Souza, 2007).

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