

MAIZE BIOFORTIFICATION SUMMARY

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A new cycle of mass selection for agronomic and pro-vitamin A (ProVA) traits was obtained in the ProVA synthetic variety (n=100). For total ProVA, and total carotenoids, the average values for 100 ears ($\mu\text{g g}^{-1}$, dwb) were 8.2 and 31.5, respectively, while, the average values were 10.6, and 35.8 for the 15 selected ears. The inbred lines 521236, 131113-01-1-4-1, 521550 and L57500.07 presented higher concentrations of favorable alleles for most of the traits. The hybrid 521236/262811-8-2 had good performance for grain yield and good stability. The hybrid 521236/11113-01-1-4-1 combined high grain yield and high levels of ProVA. Four sets of primers that amplified polymorphisms within the genes *lycE* and *crtRB1*, previously reported as associated with increased levels of ProVA, were tested using 10 maize inbred lines from the Embrapa Breeding Program contrasting for carotenoid content, in 2010. The results indicate that it is possible to use Marker Assisted Selection (MAS) to track the superior alleles for ProVA content in the maize kernel. Further germplasm screening will be continued and a breeding program will be designed and initiated in the next project to apply these molecular tools to develop biofortified maize cultivars. The superior allele for *lycE* gene (allele 4) was presented in four out of the 10 maize lines evaluated, whereas the superior allele of the gene *crtRB1* was not presented within the current Brazilian germplasm. For the other two primer combinations superior alleles were detected in the Embrapa germplasm in different frequencies. These results show that it will be possible to use the marker-assisted selection to track the superior alleles for ProVA content in maize. However, further germplasm screening will be necessary and a specific breeding program needs to be designed to use the molecular tools to develop biofortified maize cultivars.