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zebra7 and *luteus17* are allelic to *lemon white1*.

--Stinard, PS and Sachs, MM

Based on map location, function, and predicted phenotype, Stinard (2013 MNL 86:29-31) hypothesized that the maize *lemon white1* (*lw1*) locus encodes the plastidial (MEP pathway) isoprenoid biosynthetic enzyme HMBPP reductase (HDR), associated with gene model GRMZM2G027059 on chromosome 1L. Using a map-based cloning approach, Lu *et al.* (2012. Molecular Plant 5:1100-1112) associated HDR with the *zebra7* (*zb7*) locus, also on 1L. Presumably due to their divergent mutant phenotypes, no allele tests between *lw1* and *zb7* have been reported. In order to resolve the discrepancy between the loci associated with HDR, we conducted tests of allelism between *lw1* and *zb7*, and also included the 1L mutants *l17* and *w18* in our tests due to their map locations in proximity of *lw1*. It should be noted that *l17* mutants are also associated with lemon endosperm, but *zb7* and *w18* mutants are not.

Plants heterozygous for *lw1*, *l17-N544*, and *w18-N495A* were crossed to plants heterozygous for *zb7-N101*. The progeny kernels from these crosses were planted in sand benches and the resulting seedlings scored for mutant phenotypes. Crosses of *lw1* and *l17-N544* heterozygotes to *zb7-N101* heterozygotes segregated for zebra seedlings (Figures 1 and 2). Crosses of *w18-N495A* heterozygotes to *zb7-N101* heterozygotes resulted only in green nonmutant seedlings (data not shown).

In order to rule out the possibility of nonallelic noncomplementation between *zb7-N101* and *lw1*, zebra plants from the allelism test cross between these two mutants were grown to maturity in the field and self-pollinated. These doubly heterozygous *zb7-N101/lw1* plants were also crossed to plants heterozygous for *l17-N544* in order to provide additional phenotypic data. Seeds from these selfs and crosses were planted in the sand bench and the resulting seedlings were scored for mutant phenotypes. All seedlings from the selfs of doubly heterozygous *zb7-N101/lw1* plants were either zebra or albino—no green seedlings resulted (Figure 3). We conclude that *zb7-N101* and *lw1* are mutants at the same locus. Crosses of the doubly heterozygous *zb7-N101/lw1* plants to *l17-N544* heterozygotes resulted in ears giving rise to seedlings segregating for luteus (presumably *l17-N544/lw1* heterozygotes), zebra (presumably *l17-N544/zb7-N101* heterozygotes), and green (heterozygotes for the nonmutant *L17* allele; Figure 4). These data provide additional confirmation of the allelism of all three mutants. Since the *lw1* locus name has precedence in the literature (Tulpule, SH. 1954. Am J Bot 41:294-301) vs. *zb7* and *l17* (Neuffer, MG and Beckett, JB. 1987. MNL 61:50), we propose that the *lw1* locus name be retained, and *zb7* and *l17* mutant alleles be renamed as alleles of *lw1*.

Figure 1. Seedlings from the cross of a *zb7-N101* heterozygote by a *lw1* heterozygote, alongside homozygous *zb7-N101* and *lw1* controls. Left: *zb7-N101/lw1* double heterozygotes. Middle: *zb7-N101* homozygotes. Right: *lw1* homozygotes.



Figure 2. Seedlings from the cross of a *zb7-N101* heterozygote by a *l17-N544* heterozygote, alongside *l17-N544* control. Left: *zb7-N101/l17-N544* double heterozygotes. Right: *l17-N544* homozygotes.



Figure 3. Seedlings from the self pollination of a *zb7-N101/lw1* double heterozygote. Zebra seedlings on the left were grown from yellow kernels. Albino seedlings on the right were grown from lemon kernels.



Figure 4. Seedlings from the cross of a *l17-N544* heterozygote by a *zb7-N101/lw1* double heterozygote. Green (presumed *L17* heterozygote) and zebra (presumed *l17-N544/zb7-N101* double heterozygote) seedlings on the left were grown from yellow kernels. Luteus (presumed *l17-N544/lw1* heterozygote) seedlings on the right were grown from lemon kernels.

