From the wide array of synthetic hexaploids (*T. turgidum / Ae. tauschii*) produced in CIMMYT and after an initial field screen in Baja California (sea water dilution from 8 to 24 d), we selected a few promising salt-tolerant types from the synthetic germ plasms that were subsequently evaluated in hydroculture (Table 1). The expected differences in Na and K concentrations in the leaf sap are caused by the presence of the enhanced K/Na discrimination character in the hexaploids but not in the tetraploids. The dry weights and satisfactory K/Na discrimination values of the synthetic hexaploids indicate that the *Ae. tauschii* D genome is the carrier for this trait. Maximum Ka:Na differentiation is obtained at 50 mM, but higher levels of NaCl can be utilized. We have focused on capturing the expression of the stress trait in a workable background (synthetic hexaploid) for bread wheat improvement and not screening *Ae. tauschii* accessions per se.

References.

Gorham J. 1990. Salt tolerance in the Triticeae: K/Na discrimination in *Aegilops* species. J Exp Bot **41**:615-621.

Gorham J, Hardy C, Jones RGW, Joppa LR, and Law CN. 1987. Chromosomal location of a K/Na discrimination character in the D genome of wheat. Theor Appl Genet **74**:584-588.

Waterlogging tolerance of synthetic bread wheats under field conditions.

R.L. Villareal, O. Bañuelos, K.O. Sayre, M. Van Ginkel, and A. Mujeeb-Kazi.

Typical responses in wheat to waterlogging are early senescence, slower root growth, cessation of seminal root growth, and decreased nutrient accumulation. The effect of flooding on wheat is serious at crown root initiation, flowering, and grainfilling. The main objective of the study was to evaluate the waterlogging tolerance of 95 elite synthetic hexaploid wheats derived from '*T. turgidum / Ae. tauschii*' crosses developed by CIMMYT's Wheat Wide Crosses Program under field conditions in northwest Mexico. The study was conducted at the Mexican National Institute of Forestry, Agriculture and Livestock, CAEVY research center near Ciudad Obregon, Sonora, Mexico, during the 1996–97 and 1997–98 crop seasons. The trials were arranged in an alpha-lattice design with two replications. An experimental unit consisted of 3-row plots, 20 cm apart and 2 m long. Seeding was by machine in dry soil at the rate of 100 kg/ha followed by a light, uniform irrigation. Waterlogged conditions were established using flooded basins measuring 12 m wide x 11 m long. Test materials were subjected to waterlogging treatment for 7 weeks, beginning 15 days after emergence, to allow uniform crop emergence until about boot stage. For the entire waterlogging treatment, continuous standing water was maintained within a range of approximately 3–8 cm. The basins then were dried, and two additional short-term irrigations were given at 2-week intervals to allow nonstress maturing.

Results of the waterlogging screening tests involving 95 synthetic hexaploids and three bread wheat check cultivars are summarized in Table 2. The degree of leaf chlorosis on a plot basis was used as the principal criterion for waterlogging tolerance. Evaluation scores were made a day after the 7-week water stress treatment to avoid interaction due to recovery of the genotypes to water stress. Mean percent chlorosis over 2 years ranged from 7 % (Dverd 2 / *Ae. tauschii* 221) to 75 % (Altar 84 / *Ae. tauschii* 188) with an overall mean of 43 %. Five synthetic entries had leaf chlorosis scores less than 10 % as compared to 14 %, 17 %, and 75 % leaf chlorosis scores of the bread wheat checks Ducula, Pato Blanco, and Seri M82, respectively.

The mean grain yield/spike of the synthetics was 1.37 g. The synthetic 'D67.2 / P66.270 // *Ae. tauschii* (221)' had the highest yield/spike (2.19 g), whereas 'Botno / *Ae. tauschii* (625)' had the lowest (0.62 g). Seventy-six percent of the test entries had flowering dates later than the checks. The mean number of days to flowering for all synthetics was 109. Forty entries were taller than the checks, measuring more than 88 cm. The tallest was method is based on the fact that Al^{+3} tolerance in wheat is largely a function of Al^{+3} exclusion from the roots. The scoring (1–3) scale relates well with Al^{+3} tolerance of the annual/perennial Triticeae germ plasm. This scale corresponds to root tip growth after immersion of the roots in a nutrient solution containing 46 ppm of aluminum, subsequent staining of the roots with an aqueous solution of 0.2 % hematoxylin, and observation for any continued root growth. Scoring categories were tolerant, medium tolerant, and susceptible. Ten seedlings were tested for each entry. The tolerant and susceptible bread wheat check cultivars, CNT-1 and Glennson 81, respectively, also were included.

Interspecific hybrids between *T. turgidum* and *Ae. tauschii* have led to production of several synthetic hexaploids, with which screening may enable identification of the D-genome Al^{+3} tolerance and provide another diversity resource for wheat improvement. However, in the 95 synthetic wheats screened, no tolerance was observed. All synthetic entries were just as susceptible as their durum parents and the susceptible Glennson 81 bread wheat check. Although we did not screen the *Ae. tauschii* accessions, this aspect could be studied further. We can safely conclude that genetic expressivity of the trait in synthetics screened was nonexistent or not expressed. *Ae. tauschii* germ plasm, especially those accessions collected from environments with acid soil, are solicited from coöperators for production of new synthetics at CIMMYT.

Reference.

Lopez-Cesati, J, Villegas E, and Rajaram S. 1986. CIMMYT's laboratory method for screening wheat seedling tolerance to aluminum. **In:** Wheat Breeding for Acid Soils, Review of Brazilian/CIMMYT Collaboration, 1974-1986 (Kohli MM and Rajaram S eds). CIMMYT, Mexico. pp. 59-65.