Reverse Chromosome Engineering: Domestication of the Wild Tetraploid Oat Avena magna. (C08-jellen115201-Oral)

Authors:

- E.N.Jellen* - *Brigham Young University*
- G.Ladizinsky - *The Hebrew University of Jerusalem*
- J.L.Beard - *Brigham Young University*
- P.H.McCord - *Brigham Young University*
- M.R.Stevens - *Brigham Young University*

Abstract:

Avena magna is a wild tetraploid from Morocco having larger seed and higher protein than common hexaploid oats. To develop this species as a crop, A. magna was subjected to four cycles of hybridization with A. sativa (6x) with selection for tetraploidy, domestication traits (awnlessness, glabrous lemma, yellow lemma, adhering spikelet), and upright growth. In the BC2F2, DNAs from domesticated- and wild-phenotype plants were bulked and screened with 29 AFLP primer combinations. The two most informative primer combinations were then used to screen DNA from one-third of the 117 BC2F2 plants. Nine polymorphic bands were detected, none of which was linked to the domestication traits upon further inspection. The 117 BC2F2 plants were also examined using C-banding. A telomeric knob on the long arm of chromosome 5C from A. magna was linked to shattering, awnedness, and lemma color. Fourth-cycle domesticated lines have long-day sensitivity and varying degrees of susceptibility to crown rust and BYDV, and one line with sativa-like florets has been isolated. In all other respects, they resemble A. sativa and are thus a valuable new genepool for developing warm-season oat cultivars.

Corresponding Author Information:

Eric Jellen
Brigham Young University
289 WIDB
Provo, UT 84602

phone: (801)422-7279
fax: (801) 422-0008
e-mail: enj@email.byu.edu

Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 3:10 pm

Keywords:

oat, Avena magna, domestication syndrome, chromosome engineering