Registration of Seventeen Spring Two-Rowed Barley Germplasm Lines Resistant to Russian Wheat Aphid

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TARS 0620B (Reg. No. GP-144, PI 642906), STARS 0621B (Reg. No. GP-145, PI 642907), STARS 0622B (Reg. No. GP-146, PI 642908), STARS 0623B (Reg. No. GP-147, PI 642909), STARS 0624B (Reg. No. GP-148, PI 642910), STARS 0625B (Reg. No. GP-149, PI 642911), STARS 0626B (Reg. No. GP-150, PI 642912), STARS 0627B (Reg. No. GP-151, PI 642913), STARS 0628B (Reg. No. GP-152, PI 642914), STARS 0629B (Reg. No. GP-153, PI 642915), STARS 0630B (Reg. No. GP-154, PI 642916), STARS 0631B (Reg. No. GP-155, PI 642917), STARS 0632B (Reg. No. GP-156, PI 642918), STARS 0633B (Reg. No. GP-157, PI 642919), STARS 0634B (Reg. No. GP-158, PI 642920), STARS 0635B (Reg. No. GP-159, PI 642921), and STARS 0636B (Reg. No. GP-160, PI 642922) are spring, two-rowed barley (Hordeum vulgare L.) lines developed cooperatively by the USDA-ARS, in Stillwater, OK, and Aberdeen, ID, as sources of resistance to Russian wheat aphid (RWA) [Diuraphis noxia, (Mordvilko)]. Each line has a different source of resistance in one of four, two-rowed, malting barley cultivar backgrounds (Table 1). Thirteen of these lines have a high level of resistance to RWA, and four have an intermediate level of resistance when seedlings were tested in the greenhouse with greenhouse-reared RWA colonies (Table 1). Greenhouse seedling screening resistance ratings have been shown to accurately predict field resistance (Mornhinweg et al., 2006a; Bregitzer et al., 2003). The major component of resistance in these lines is tolerance. Even while supporting high RWA populations, leaves of resistant germplasm lines do not roll or streak in response; therefore, yield reductions due to head trapping and chlorosis of susceptible cultivars do not occur in these lines. Leaves of moderately resistant lines do roll and streak, spikes are trapped, and chlorosis occurs; however, yield is not as severely reduced in these lines as in susceptible cultivars (Mornhinweg et al., 2006a). Devastating yield losses occurred in wheat (Triticum aestivum L.) and barley in the western USA within the first appearance of the RWA in 1986 (Porter et al., 1988) and in the early growth of the entire USDA-ARS National Small Cereal Grain Research and Development Program (Mornhinweg et al., 1995, 1999). These lines, although highly resistant to RWA, feeding damage, were not well adapted to U.S. barley production environments. Breeder concern over potential negative effects of unadapted germplasm on the agronomic performance and malting quality of elite breeding germplasm lines led to the initiation of a backcross breeding program in 1996. Selected lines were crossed with unadapted RWA-resistant germplasm lines in backgrounds adapted to all barley-growing areas of the USA where RWA occurs. All 109 unadapted resistant lines were used in the backcrossing program. Seven RWA-resistant winter feed barley germplasm lines, in a ‘Schuyler’ (Jensen, 1972) background released in 1993, 1995, 1999 (Mornhinweg et al., 2006a). Similar to the two-rowed spring germplasm lines, a set of six-rowed spring germplasm lines (Mornhinweg et al., 2006b). Simultaneously, two-rowed spring feed barley germplasm lines are being released to breeders in 1995, 1999, respectively. These lines are competitive with current U.S. barley cultivars. In the present germplasm release, all lines have superior agronomic performers in each of four two-rowed barley backgrounds, ‘B1202’, ‘Crest’ (Muir et al., 1992), ‘Harrington’ (Mornhinweg et al., 1991), and ‘Harrington’. These lines are...