Registration of N551 and N552 Parental Inbred Lines of Maize

Inbreds N551 (Reg. no. PL-324, PI 638549) and N552 (Reg. no. PL-325, PI 638550) are yellow-dent maize (Zea mays L.) lines developed and released by the Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln in 2005. N551 was developed by seven generations of self-pollination from the population NCLNB_01. This population was formed from a diallel cross of 18 lines with some tolerance to corn lethal necrosis (CLN), a disease caused by the synergistic interaction between maize chlorotic mottle machlomovirus and any potyvirus that infects cereals (Scheets, 1998), and then by one cycle of selection based on S1 and S2 evaluations for tolerance to CLN. The primary background of NCLNB_01 is Stiff Stalk germplasm (B14A and B68). N552 was developed by seven generations of self-pollination from the population NS[S1]1_08. This is the eighth cycle of a Stiff-Stalk population improved for S1 per se performance based on grain yield and percentage of standing plants. The NCLNB_01 and NS[S1]1_08 populations were developed by M. Thomas-Compton and W.A. Compton (Compton et al., 1998), respectively.

Both inbreds have been evaluated in hybrid combination on several testers from 2001 through 2004 and in multiple locations ranging from central Nebraska to central Iowa, with the majority being irrigated locations in eastern Nebraska. Compared to FR1064 hybrids with the same testers, the N551 hybrids had significantly greater grain yield (+0.6 Mg ha\(^{-1}\)), approximately the same grain moisture at harvest, more stalk lodging, and less root lodging (Table 1). Only the difference in grain yield was statistically significant. The N552 hybrids also had significantly greater grain yield than the FR1064 check hybrids (+0.5 Mg ha\(^{-1}\)) and in addition had significantly lower grain moisture at harvest (−0.5% point). The N552 hybrids had more stalk lodging and less root lodging than the check hybrids, but neither difference was statistically significant.

In per se evaluation trials conducted in 2003 and 2004 at an irrigated nursery in Lincoln, NE, N551 had 15% less grain yield than the inbred check, B73, whereas N552 had 41% more grain yield (Table 2). The high grain yield of N552 was partially attributable to prolificacy, as nearly every plant of N552 produced two ears in 2004. The 100-kernel weight of N551 was not significantly different from B73, whereas the 100-kernel weight of the kernels from the primary ear of N552 was approximately 25% greater than B73. The second ears of N552, when produced, had kernels that were smaller than those of the primary ear. Neither N551 nor N552 exhibited any silk delay relative to pollen shed. Compared to B73, N551 flowered 1 to 2 d later, and N552 flowered 1 d earlier. Plant height (+10 cm) and equivalent ear height (-9 cm) of N551 were shorter in both plant height (−9 cm). Cob color of N551 is white; N552 is red cobs. Late-season plant health of N551 was good, but nearly half of the plants of N552 were broken below the ear by early October in 2004. Therefore, if used as a female in seed production, N552 likely would need to be harvested early to avoid harvest losses.

Based on the testcross data, both N551 and N552 have potential as parents in hybrid seed production. They should have value as parents in breeding programs for one reason: their unique parentage. Many female lines in maize seed industry are descendants of B73, and neither is a direct descendant of B73, another attribute of N551 and N552 is its Stiff-Stalk derived inbreds. N551 and N552 are Stiff-Stalk derived inbreds, and neither is a direct descendant of B73. Another attribute of N551 and N552 is its white cob color. This is a desirable attribute in grade industry, and most existing female lines have red cobs. Late-season plant health of N551 was good, but nearly half of the plants of N552 were broken below the ear by early October in 2004. Therefore, if used as a female in seed production, N552 likely would need to be harvested early to avoid harvest losses.

Small quantities of Breeder seed will be maintained by the Department of Agronomy, University of Nebraska-Lincoln, NE 68583–0915 and distributed on written request. Recipients of seed of either line are asked to make appropriate recognition of the University of Nebraska-Lincoln if the line is used in the development of a new population or hybrid.

### References

Compton, W.A., S.M. Kaeppler, and D.D. Galusha. 1998. Registration of NBS(8), NSS(8), NB(S)RF(8), and NS(B)RF(8) germplasm. Crop Sci. 38:287–288.

### Table 1. Performance of inbreds N551 and N552 in hybrid combinations relative to check hybrids at locations from central Nebraska in 2001 through 2004.

<table>
<thead>
<tr>
<th>Test hybrid</th>
<th>Check hybrid</th>
<th>Years</th>
<th>No. of locations</th>
<th>Grain yield</th>
<th>Grain moisture</th>
<th>Stalk lodging</th>
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