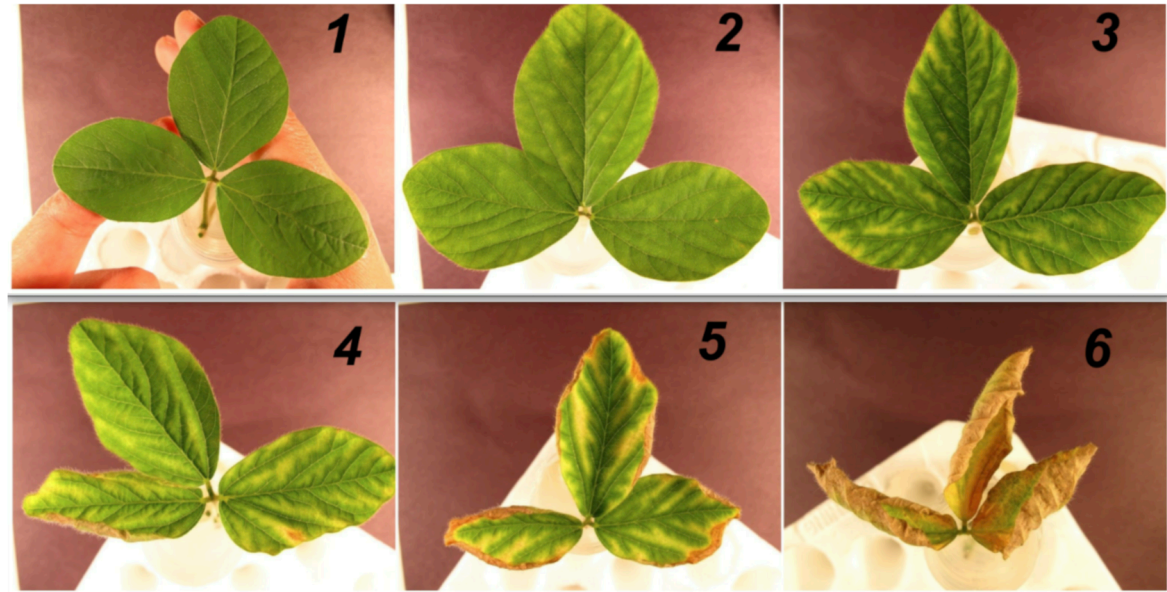
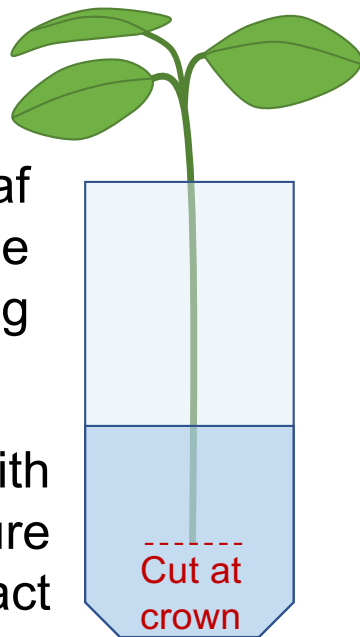


Culture extract/  
toxin assay for  
SDS screening.

Three-leaf  
stage  
seedling

Tube with  
*Fv* culture  
extract



**Figure 1.1.** Examples of symptom severities used for the 1 to 6 rating scale where 1 = no symptoms; 2 = leaf showing general slight yellowing or slight red venial chlorosis at the edge of the leaves (<10% foliage affected); 3 = leaf with obvious inter-veinal chlorosis or larger area of venial chlorosis without cupping at the leaf edge (10-30% foliage affected); 4 = leaf with necrosis along a portion or its margin with a little curled at leaf edge (30-50% foliage affected); 5 = necrosis along the entire margin of a leaf and leaf cupped (50-80% foliage affected); and 6 = most of the leaf area (>80% foliage affected) showing interveinal necrosis

**Obj. 1.** Screen adapted Kansas germplasm and KSVT entries for SDS resistance using three high-throughput methods.

CONTROL

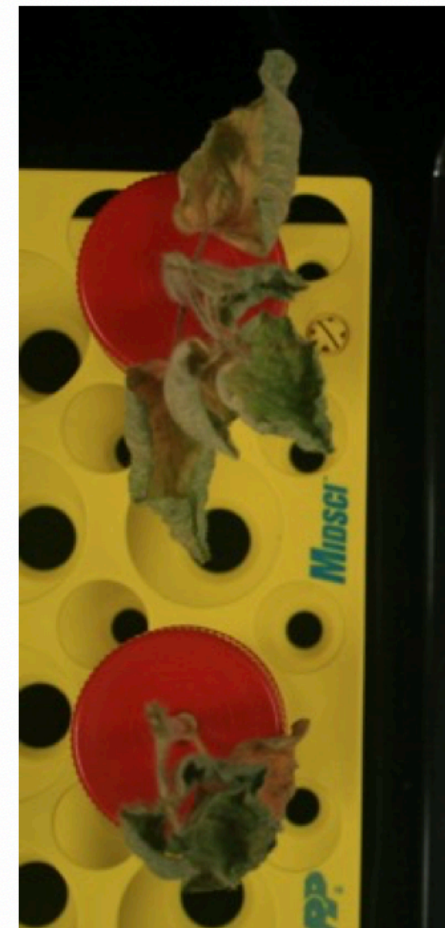


+TOXIN

'KS5507 NRR' (non-senescent & toxin resistant)



'KS 13-1830' (non-senescent & toxin susceptible)



'Morgan' (senescent & toxin susceptible)





K16-1786 (NS, ToxR)

K16-1991 (S, ToxR)

K16-1501 (S, ToxS)

Non-senescent and toxin resistant (left), non-senescent and toxin susceptible (middle), and senescent and toxin sensitive (right) entries from the soybean breeding program materials. **C** = control; **+Tox** = culture-filtrate.

## 2018 Kansas Soybean Variety Trial

	<b>Toxin resistant (1-2)</b>	<b>Toxin susceptible (&gt;2-6)</b>
<b>Non-senescent (1-2)</b>	Asgrow (AG4232); Credenz (CZ 3548 LL, CZ 3738 LL, CZ 4308 LL, CZ 4918 LL, HBK LL 4953); Dyna Gro (S37XT28, S38RY87); Frontier Seed (4SR82); Kansas AES (K12-2333, K4313NRRT, KS5507NRR); LG seeds (C3489RX, C3775RX); Midland (3537NX, 3633NR2, 3657NRZ, 4328NX); Phillips (408NR2XS, 456NR2XS); Syngenta (GH3195x, GH3985x); Willcross (WX1445NLL, WX1745NLL).	Arkansas (Osage, R13-1019); Asgrow (AG 5335); Credenz (CZ 3841 LL, CZ 4222 LL); DynaGro (S35XT97, S46xS87, S49XS88); Frontier (3SR92); Kansas AES (K13-1830, KS5004N, KS5502N); Midland (4373NR2, 4677NXS); 4737 RXT); Phillips (348NR2X, 387NR2X, 411NR2Y, 408NR2XS, 478NR2XSE); Public (Ripley); Syngenta (GH2981x, GH3546x, GH3324x, GH4542x); Willcross (WXE3377ND, WXE3386N, WXE3437N, WXE3497NS, WXE3466NS)
<b>Senescent (&gt;2-6)</b>	Arkansas (R09-430, UA 5014 C, UA 5414RR); Credenz (CZ 3601 LL, CZ 4748 LL); Dyna Gro (S48XS78); Emerge Genetics (e4996s); Frontier Seed (49GT02); Kansas AES (K12-1348, KS3406RR); LG Seeds (C4227RX, C4458 RX); Midland (3926NRS2, 3983NRZ, 4797NRS2, 4956NXS); Morsoy (4426 RXT, 4857RXT, 4963NRS2, 4737 RXT, 4117RXT, 4706RXT); Phillips (363NR2YE); Public (LD06-7862); Syngenta (GH4307x); Willcross (WXE3367N, WXE3487NS, WXE3446NS, WX1441NLL).	Asgrow (AG3432); Credenz (CZ4105 LL, CZ 4548LL, CZ 4938 LL); Dyna Gro (S39XT68, S43XS27); Emerge Genetics (e3796, e4394, N4746s, e4766s, e4892s, e4993s, T4846s); Frontier (41GT37, 4SR62); Kansas (AES K11-2363B, KS4313 N, KS4117NS, K12-2333, K12-1355, K13-1615); LG Seeds (C3026RX, C3333RX, C3550 RX, C3985 RX, C4615 RX); Midland (3938NX); Missouri (S13-1805C, S13-1955C, S13-3851C, S13-2743C, S13-10590C, S14-9051R); Morsoy (3907 RXT, 4327 RXT, 4535RXT, 4667 RXT, 4997 RXT); Phillips (306NR2XS, 454R2YSE); Public (LS09-1920, Morgan, Spencer); Syngenta (GH3982x, GH3761X, NK S39-T2, NK S39-T3); Willcross (WXE3517NS).

## Soybean Breeding Program Material

	<b>Toxin resistant (1-2)</b>	<b>Toxin susceptible (&gt;2-6)</b>
<b>Non-senescent (1-2)</b>	K16-1194, K16-1786, K16-1989, K16-1649, K16-2015, K16-1548, K16-1552, K16-1685, K16-1630	K16-1879, K16-1767, K16-1576, K16-1643, K16-1991, K16-1880, K16-1789, K16-1561, K16-1879, K16-2025, K16-2012, K16-1245, K16-1881, K16-1777, K16-2016, K16-1687, K16-1889, K16-1903, K16-1914, K16-2001, K16-1664, K16-1492, K16-2019, K16-1645, K16-1815, e4993, K16-1884, K16-1872, K16-1690, K16-1621, K16-1675, K16-1788, K16-1869, K16-1793, K16-1765, K16-1698, K16-1774, K16-1233, K16-1722, K16-1917
<b>Senescent (&gt;2-6)</b>	K16-1190, K16-1572, K16-1197, K16-1488, K16-1502, K16-1200	K16-1659, K16-1524, K16-1821, K16-2052, K16-2010, K16-1787, K16-1202, K16-1206, K16-1797, K16-1817, K16-1623, K16-1651, K16-1882, K16-1662, K16-1537, K16-1846, K16-1863, K16-1716, K16-1591, K16-1585, K16-1218, KS 5518 (1), K16-1753, KS 5004 N (2), K14-1717-1, K16-2041, K16-1999, K16-1556, K16-1498, K16-1696, K16-1516, K16-1542, K16-1221, K16-2032, K16-1199, K16-1875, K16-1229, K16-1228, K16-1504, K16-1231, K16-2040, K16-1763, K16-1764, K16-1637, K16-2155, K16-1503, K16-1509, K16-1222, K16-1634, K16-1730, K16-1837, K16-1227, K16-1564, K16-1235, K16-1467, K16-2148, K16-1195, K16-1208, K16-1755, K16-1472, K16-1874, K16-1203, K16-2130, K16-1540, K16-1209, K16-1704, K16-2044, K16-1550, K16-1843, K16-1204, K16-2043, K16-2012, K16-2049, K16-1706, K16-2105, K16-1723, K16-1211, K16-2026, K16-1729, K14-1717-5, K16-1215, K16-2048, K16-1213, K16-1501, K16-1702

**Relationship between growth chamber senescence ratings & toxin ratings with field SDS severity index scores (SDSX) for the same soybean genotypes.**

