ITEMS FROM THE UNITED STATES OF AMERICA

KANSAS

KANSAS STATE UNIVERSITY
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Water use efficiency of six cover crops.

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Cover crops are crops grown to protect soil from erosion and loss of nutrients by leaching. Cover crops are desirable because they not only hold the soil in place but also are efficient in using water. Little information exists concerning the water use efficiency of different cover crops. One way to determine water use efficiency is to analyze the carbon isotope ratio of the leaves. The number, called the $\delta^{13}C$, represents the difference between the ratio of ^{13}C–^{12}C found in a given sample and the ratio that exists in a standard. The ratio is expressed as a per mill ($^{o}/_{oo}$) deviation from the standard. In plants with the C_3 photosynthetic system, an inverse relationship exists between the carbon isotope ratio and water use efficiency (Kirkham 2011). That is, plants with the least negative value of $\delta^{13}C$ have the highest water use efficiency.

Because no one had determined the water use efficiency of cover crops in Kansas by measuring the carbon isotope ratio, we grew six cover crops and determined their ratios. The crops, all with C_3 photosynthesis, were planted in the fall of 2010 in Manhattan, Kansas. The six crops were winter wheat, triticale, oat, Austrian winter pea (*Pisum sativum* var. *arvense* Poir.), red clover (*Trifolium pratense* L.), and alfalfa (*Medicago sativa* L.). In the spring of 2011, an area 1 m^2 from each plot was harvested. The leaves were ground, and a sample was taken and placed in 120-cm^3 plastic container and submitted to the Stable Isotope Mass Spectrometry Laboratory in the Division of Biology at Kansas State University. The laboratory determined the $\delta^{13}C$ of the different crops as well as the carbon concentration in the leaves (Table 1).

Table 1. The effectiveness of pretreatment of winter bread wheat seed with insecticide (imidaclopryd (0.35kg/t))–fungicide compositions at tillering, average for 2008–09.

Species of fly	Damaged tillers		Technical effectiveness (%)
	Control (fungicide)	Fungicide + insecticide	
Mayetiola destructor	1.5	0.5	66.7
Oscinella spp.	5.4	0.8	85.2
Phorbia securis	0.8	0.3	62.5
Others	0.6	0.2	66.7
Total	8.3	1.8	78.3

The three grain crops (wheat, triticale, and oat) had the least negative $\delta^{13}C$ and the lowest carbon concentration in their leaves. Wheat had the least negative $\delta^{13}C$ of all cover crops, and its value differed from the next value (triticale) by almost 2%. The three legumes (Austrian winter pea, clover, and alfalfa) had the most negative $\delta^{13}C$ and highest carbon concentration in the leaves. Because wheat had the least negative $\delta^{13}C$, the results indicated that it had the highest water use efficiency of the six cover crops studied. Therefore, in addition to being a hardy cover crop to grow during the cold winters in Kansas, winter wheat also appears to have the benefit of having high water use efficiency.

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News.

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Notice of release of KS14WGRC61 Fusarium head blight-resistant wheat germ plasm.

Bernd Friebe, William Bockus, P.D. Chen, L.L. Qi, Joey Cainong, Duane L. Wilson, W. John Raupp, Jesse Poland, Robert L. Bowden, Allan K. Fritz, and Bikram S. Gill.

The Agricultural Research Service, U.S. Department of Agriculture and the Kansas Agricultural Experiment Station announce the release of **KS14WGRC61** hard red winter wheat germ plasm with resistance to Fusarium head blight (FHB) for breeding and experimental purposes. KS14WGGRC61 is derived from the cross TA5655/TA3809*2//TA9121*2 F_3, where TA5655 is a disomic wheat-*Elymus tsukushiense* Honda Robertsonian translocation TW·1E^{ts}#1S, TA3809 is a Chinese Spring stock homozygous for the *ph1b* mutant allele, and TA9121 is the hard red winter wheat cultivar Everest. KS14WGRC61 is homozygous for a distal wheat–*E. tsukushiense* recombinant chromosome TWL·WS-1E^{ts}#1S, consisting of the complete long arm and most of the short arm of a wheat chromosome and a distal segment derived from 1E^{ts}#1S. The E^{ts}#1S segment in this translocation has a gene that confers type-2 resistance to FHB. The TWL·WS-1E^{ts}#1S stock is a novel source of FHB resistance and may be useful in wheat improvement. Small quantities (3 grams) of seed of KS14WGGRC61 are available upon written request. We request that the appropriate source be given when this germ plasm contributes to research or development of new cultivars. Seed stocks are maintained by the Wheat Genetics Resource Center, Throckmorton Plant Sciences Center, Kansas State University, Manhattan, KS 66506.

Evaluating a core collection for stress tolerance in the field.

Duane L. Wilson, W. John Raupp, Sunish Sehgal, Bernd Friebe, and Bikram S. Gill.

A core set of *Aegilops*, *Triticum*, and *Dasypyrum* accessions was evaluated at the Rocky Ford Research Area, Manhattan, KS, for field resistance to leaf rust, barley yellow dwarf virus, and powdery mildew (Table 1, pp. 138-147). The lines also were evaluated for heading date. Leaf rust reaction was recorded on three dates and barley yellow dwarf and powdery mildew on two. Virus infection was rated as symptoms on visible as chlorosis, necrosis of the leaf tips and leaves, or purpling of the leaves. One accession of *Ae. columnaris*, *Ae. peregrina*, *Ae. sharonensis*, *Ae. umbellulata*, *T. aestivum*, and *T. zhukovskyi*; two accessions of *Ae. longissima*, *T. turgidum* subsps. *carthlicum* and dicoccum; and six accessions of *T. turgidum* subsp. *polonicum* were winterkilled.