

Dakota Lakes Research Farm – East River Site (Hughes County)

Dryland Rotations - 1998

1998 ACCOMPLISHMENTS: Three dryland (no-till) rotations have been practiced at the Dakota Lakes Research Farm since 1991. They are: (1) Winter Wheat – Corn – Cool Season Broadleaf, (2) Winter Wheat – Corn – Warm Season Broadleaf – Spring Wheat, and (3) Winter Wheat – Warm Season Broadleaf – Corn – Cool Season Broadleaf.

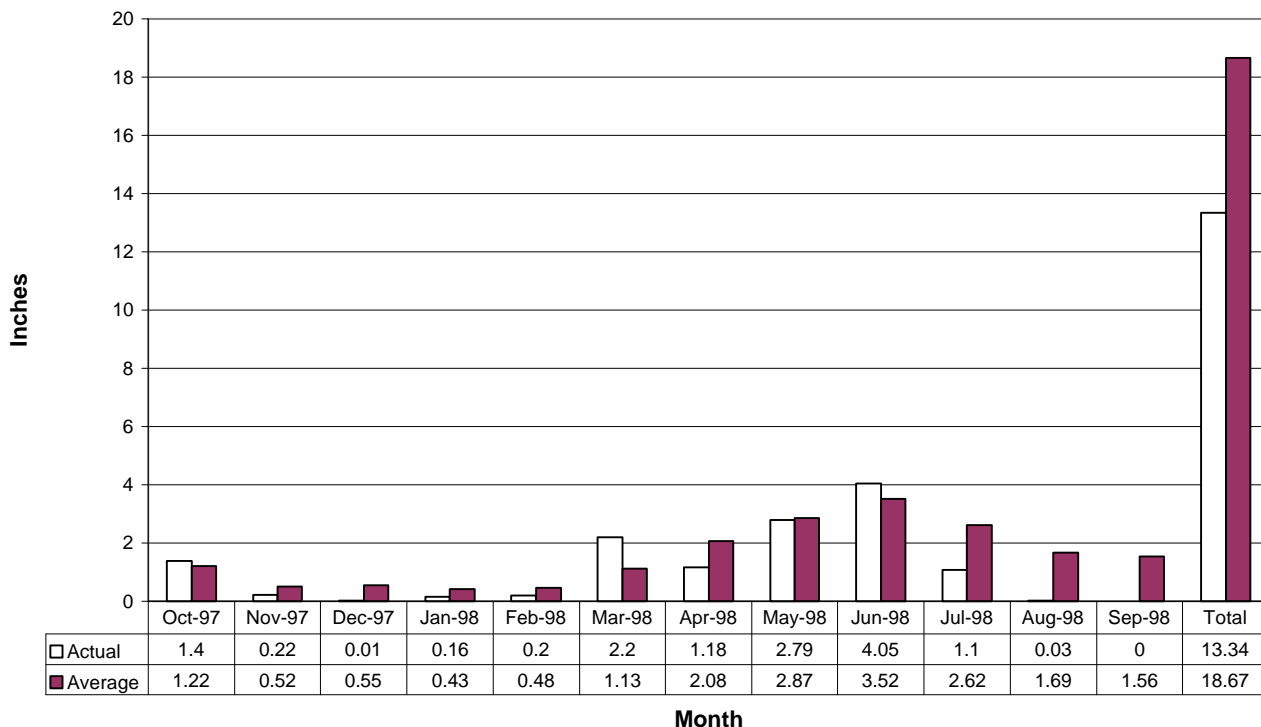
The station hosts numerous small plot studies by scientists from the main University campus but all of our work is done “production scale”. This means that field size equipment is utilized with all harvest results being weighed in a 300 bushel weigh cart. Two tractors, one 12.5’ drill, one 12.5’ row crop planter, one 37.5’ sprayer, and one combine are used for all field work. The tractors are 85 and 105 hp.

This equipment is capable of handling 600 acres per crop type. Therefore, we could farm at least 2,400 acres if all of our land was in the production enterprise (no research) and we maintained our present crop mix. We would then utilize the three dryland rotations as follows: we would plant rotation #1 (W.Wheat-Corn-Cool Season Broadleaf) on 50% of our acres and rotation #2 (W.Wheat-Corn-Warm Season Broadleaf-S.Wheat) on 25% of our acres and rotation #3 (W.Wheat-Warm Season Broadleaf-Corn-Cool Season Broadleaf) on the remaining 25% of the acres. This is assuming we are farming in a mixed grass prairie ecosystem and on soils with moderate to good water holding capacity.

The fall 1997 and spring 1998 precipitation was about average with below average moisture in July, August, and September. The research farm had 20 days of temperatures equal to or exceeding 95 degrees F and **seven** of those days exceeded a high of 100 degrees F. The recorded high at the farm this year was 108 degrees F on July 18th.

See the chart below for actual precipitation received at the farm from October 1997 through September 1998 versus average precipitation.

Dakota Lakes Research Farm
Oct. 97 - Oct. 98 Precipitation vs. Average



Please click on the corresponding number to view inputs, operations and economics.

1. Winter Wheat – Corn – Cool Season Broadleaf

Winter Wheat	-	Corn	-	Chickpea / Field Pea
85 bu		102 bu		2,187 lbs / 31 bu

Rotation #1 is designed for an average winter and precipitation year. This rotation is low in disease, weed, and insect pressure, due to two years between each crop type. The wheat variety would need to have average winter hardiness due to the wheat being seeded into a low residue producing crop (depending on the harvest method of the low residue crop, i.e. stripper header vs. conventional straight head and crop aftermath architecture). The winter wheat variety ‘2137’ yielded very well in this rotation. Winter survival was excellent behind the chickpea stubble (chickpeas were harvested with a stripper header in 1997). The corn variety was Pioneer 35R57 and was planted May 3rd at 24,000 ppa. This variety had poor seedling vigor during May and the first half of June. Chickpeas or garbanzo beans (kabuli type) was the broadleaf crop. The chickpea variety ‘Dwellely’ was grown in 1998 and yielded very well. The field pea variety ‘Carneval’ was planted on April 9th.

2. Winter Wheat – Corn – Warm Season Broadleaf – Spring Wheat

Winter Wheat	-	Corn	-	Soybean / Sunflower	-	Spring Wheat
84 bu		137 bu		29 bu / 1,608 lbs		64 bu

Rotation #2 is designed for a harsher winter (high winter kill) and/or a drier than average year. This rotation, if environmental conditions are wet in the spring wheat year and wet again in the winter wheat year, has the potential for disease pressure (tan spot or septoria leaf diseases) in the winter wheat crop. The winter wheat variety planted in this rotation could have less winter

hardiness since it is planted into spring wheat stubble. The variety harvested in 1998 in this rotation was Jagger. This variety is not recommended to be planted north of Interstate 70 in Kansas with conventional tillage, due to its low winter hardiness. However, Jagger has good resistance to the leaf spotting diseases (i.e. tan spot or septoria). In 1998, this variety averaged 84 bushels per acre. This rotation is designed to save deep “soil profile” water for two years (during the wheat years) prior to planting a high water use crop like corn. In essence, we would need three dry years in a row to have a corn crop failure. The corn variety was Pioneer 36F30 and was planted May 4th at 24,000 ppa and yielded extremely well. Soybeans (Stine 2254RR) and sunflowers (Den Besten 8130) were planted behind the corn. Sunflowers can root deeper than corn to utilize the water and/or nitrates that may leach below the corn roots. Spring wheat then follows the soybean or sunflower crop. The spring wheat variety was Russ and was planted in late March.

Spring wheat and winter wheat was also dormant seeded in this rotation. The winter wheat variety, Jagger, was seeded December 1, 1997, in both sunflower and soybean residue with 70 pounds per acre of 10-50-0 fertilizer placed in the slot with the seed. Unfortunately, Jagger was seeded at only 118 pounds per acre (the same rate as it was planted in September). The winter wheat yielded 54 bushels/acre behind sunflowers and 56 bushels/acre behind soybean stubble. The spring wheat variety, Russ, was seeded December 19, 1997, in both sunflower and soybean residue with 70 pounds per acre of 10-50-0 fertilizer placed in the slot with the seed compared with no starter fertilizer. Russ was seeded at 132 pounds per acre. The spring wheat yielded 66 bushels/acre behind sunflowers regardless of fertilizer treatment. The spring wheat yielded 74 bushels/acre behind soybean stubble with starter fertilizer compared to 72 bushels/acre without starter fertilizer.

3. Winter Wheat – Warm Season Broadleaf – Corn – Cool Season Broadleaf

Winter Wheat	-	Soybean / Sunflower	-	Corn	-	Field Pea
94 bu		34 bu / 1,843 lbs		114 bu		20 bu

Rotation #3 is designed for a milder winter (low winter kill) and wetter than average year. This rotation contains every other year broadleaf and will develop broadleaf weed problems and disease pressure in the broadleaf crops. Therefore, this rotation will possibly need to be changed in order not to rely too heavily on technology (expense with pests resistant technology i.e. Roundup Ready hybrids, Bt resistant hybrids, etc.). The winter wheat variety in this rotation needs to have good to excellent winter hardiness due to 50% low residue crops in the rotation. There is a potential for good wheat yields in this rotation due to the three-year break between wheat crops and if a mild winter and wetter than average year occurs. Jagger and 2137 were planted in this rotation in 1998 and yielded very well for being non-winterhardy varieties. Soybean (Stine 2254 RR) and/or sunflower (Den Besten 8130) are planted into the wheat stubble. The wheat stubble provides the soybean and sunflower with more deep moisture when compared to planting them behind a corn crop. The corn in this rotation will be the first corn planted on the entire farm due to darker color and lower residue conditions. Therefore, a longer season variety should be planted to take advantage of the longer season. We planted Pioneer 3489 in this rotation in 1998 and yielded very well for being a dry year. The field pea variety ‘Arvika’ was planted April 4th into corn stalks. The field peas only yielded 20 bu/acre due to heavy weed pressure. Again, in this rotation (every other year broadleaf crop) we expect this to happen in time.