

## **Integrated Crop / Livestock Systems Study - 2015 summary**

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### ***Late summer and fall grazing (Phase 3)***

Phase 3 of the Integrated Crop/Livestock systems project was initiated in 2015 focusing on providing forages at times when native range may not be of adequate quality to maintain the rate of animal weight gain. Previous phases looked at the late fall (Phase II) and winter periods (Phase I). In this phase, we continue to focus on the late fall grazing period, but also include potential needs during the late summer. Much of the native range in this area has been invaded by Kentucky bluegrass, and best use of these pastures may require grazing earlier in the season, and utilizing alternative forages in the late summer. In Phase 3, we are also looking to increase grain production while meeting critical forage needs, so harvestable grain crops are included for two years out of a three year rotation.

### **Cropping system – grazing treatments:**

*Note: these crops were also seeded in non-grazed control plots where biomass has harvested and removed (Removed) and left in place (InPlace).*

1. Spring wheat, which is inter-seeded at or around the 4-leaf stage with a 5-way mixture of intermediate wheatgrass, alfalfa, hairy vetch, red clover, and radish.
2. Inter-seeded mix from previous spring wheat allowed to grow.
3. Corn for grain inter-seeded with soybeans.

Check strips – non-grazed, grown for grain:

1. Spring wheat
2. Soybeans
3. Corn

Grazing treatments – four 30 acre pastures, 2 for each treatment, 20 cow-calf pairs in each group:

1. Graze more intensively during the early summer (Target Utilization = 60% disappearance).
2. Graze at recommended grazing levels during the early summer (Target Utilization= 50% disappearance).

All areas were sprayed May 20 with Durango @ 25.6 oz/ac + 2, 4-D LV6 @ 12.8 oz/ac + UAN N-pak @ 2.5 gal./100 gal. Spring wheat (grazing treatment and check strip) was seeded with a JD 750 drill on May 27 & 28 where corn was previously grown. All corn treatments were seeded May 29 with a JD MaxEmerge II planter where forage oats was previously grown. The soybean check strips were also planted May 29 alongside the full season cover crop treatment, which was initially planted June 12 where sudan grass was previously grown. A JD MaxEmerge II planter with 15 inch row spacing was used to plant the interseeded corn and soybean, with corn seed and soybean seed loaded in alternating planter boxes. Spring wheat was sprayed post-emergent on June 15 with Puma @ 12 oz/ac + Moxy 2E @ 16 oz/ac. The spring wheat grazing treatment was inter-seeded on June 19 with the same mixture as the full season cover crop treatment with the JD 750 drill by planting at a slight angle to the spring wheat rows. All corn treatments and soybean check strips were sprayed June 18 and July 8 with Barbarian Max @ 24 and 20 oz/ac, respectively plus Jackhammer @ 1 qt./100 gal. All spring wheat treatments were combined on September 3 without the straw chopper. Wheat straw was baled (large round bales) after grain harvest. The soybean check strip was combined October 14. All corn treatments were harvested on October 22 without the straw chopper.

Grazing: In order to assess annual grazing impacts, two sets of 20 cow-calf pairs are monitored throughout the grazing season. One set grazed on pasture throughout the season (Control), while the other set grazed on pasture and the Integrated Crops/Livestock cropping systems (ICL). Two of the 4 pastures used for the grazing portion had previously been used for grazing study while the other two had previously been hayed. Cattle were placed on all pastures on May 21st and removed as utilization approached the desired level.

Utilization was 48% and 59% on the Control and ICL pastures respectively which was close to the 50 and 60% desired in the study. The Control pastures averaged 38 grazing days by a cow-calf pair per acre while the ICL pastures average 48 grazing days per acre. Previously hayed pastures had 10 additional grazing days compared to previously grazed pastures. Beginning on August 18, the ICL herd was placed on the inter-seeded mixture (intermediate wheatgrass, alfalfa, hairy vetch, radish and red clover) portion of the ICL crop system and the Control herds were moved to other native range pastures. The 3.5 acre portion of the ICL was grazed for an average of 18 days resulting in almost 103 grazing days per acre on the cover crop mixture. Beginning on November 11, 2015, the ICL herd grazed the corn/soybean interseeded areas, which had been harvested for grain. These were grazed for 17 days or 97 grazing days per acre. Wheat straw bales had been injected with a molasses-based supplement and we planned to graze these bales after the corn/soybean. However, the cows were only on the wheat straw bales for 3 days since they would not eat the bales. This was likely due to the molasses leaking out of the bottom of the bales.

Crop	Cultivar or type	Planting	Planting rate	Fertilizer	Harvest / Grazing
Spring wheat	Glenn	5/27/15	100 lb/ac	Urea - 30 lb N/ac MAP - 30 lb mat/ac	9/3/15
Cover crop mix:		6/19/15	34 lb/ac	None	
Intermediate wheatgrass	Manifest				
Alfalfa	Vernal				
Red clover	common				
Hairy vetch	Haymaker				
Radish	Daikon				
Initial cover crop strip	As above	6/12/15	34 lb/ac	None	
Corn	Pioneer P8107HR	5/29/15	24,500 plt/ac	Urea 40 lb N/ac MAP - 30 lb mat/ac	10/22/15
Interseeded w/ Soybeans	Pioneer 90Y50	5/29/15			
Check strips					
Spring wheat	Glenn	5/28/15	90 lb/ac	Urea - 30 lb N/ac MAP - 30 lb mat/ac	9/3/15
Soybeans	Pioneer 90Y50	5/29/15	170,000 plt/ac	None	10/14/15
Corn	Pioneer P8107HR	5/29/15	24,500 plt/ac	Urea 40 lb N/ac MAP - 30 lb mat/ac	10/22/15

Table 1. Crop parameters for 2015.

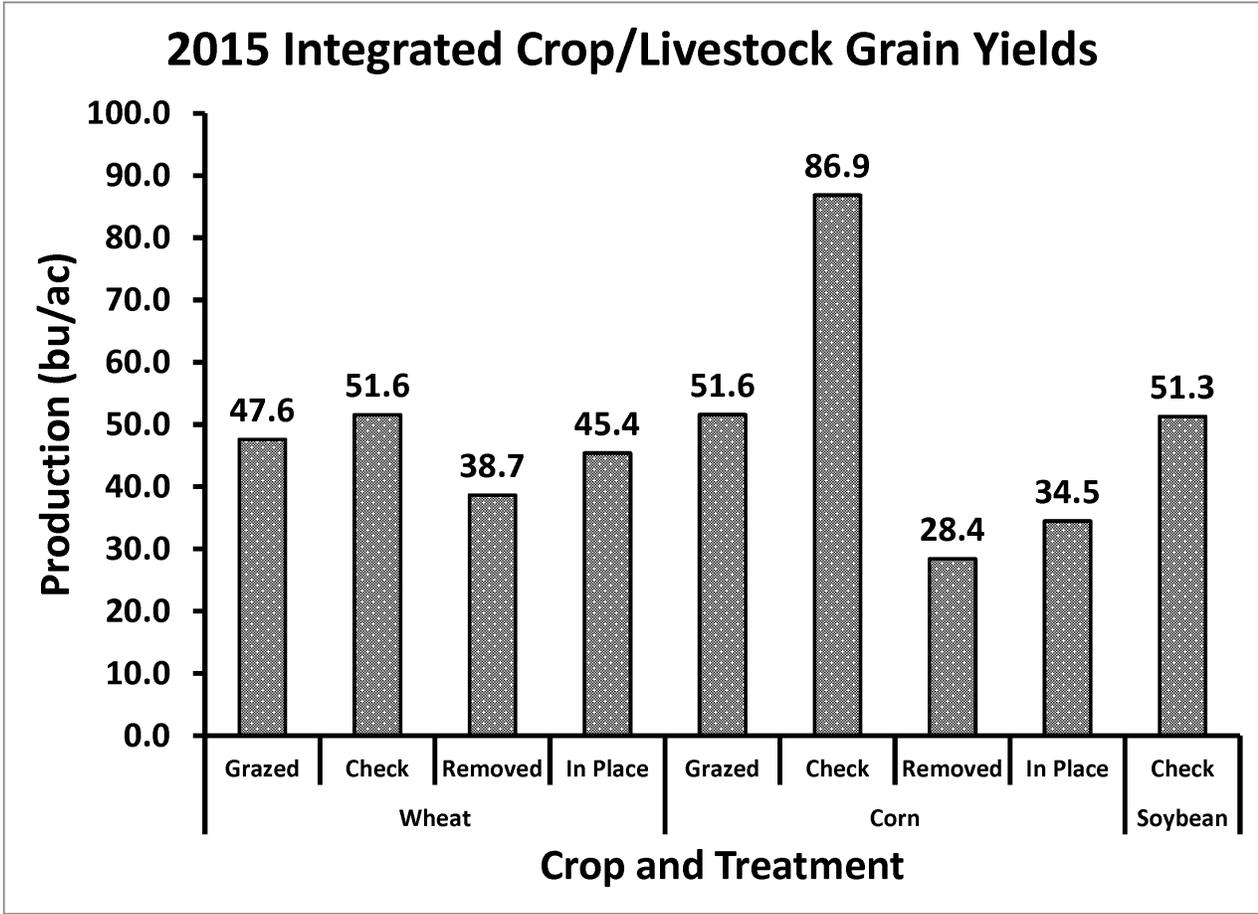


Figure 1. 2015 grain production for the grazed (Grazed) and grain crop check (Check) strips, and the non-grazed control plots where biomass is either cut and removed (Removed) or left in place (InPlace).

### Integrated crop-livestock farming system – Key aspects

