Pastured heifers grow well and have productive first lactations

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Dairy heifers that were raised on pasture in the ongoing Wisconsin Integrated Cropping Systems Trial (WICST) performed as well as or better than similar heifers that were raised in confinement. In this study, not only did heifers on managed pastures match the weights and age at first calving of their confined counterparts, but they also outperformed the confinement heifers in terms of average daily gain (ADG) during the pasture season and milk production in their first lactation.

Begun in 1989, WICST is a long-term research trial managed by the UW-Madison Agronomy Department that compares three cash grain cropping systems and three forage systems in southern Wisconsin. The trial was designed to evaluate the sustainability of farming systems that differ in crop rotation complexity and use of purchased inputs. This Research Brief describes results of one WICST cropping system (CS6) that uses managed grazing with dairy heifers. Researchers collected data on this system with support from the USDA-ARS program administered through the Dairy Forage Research Center. While caution should be used in interpreting these findings, the results reported by researchers Joshua Posner and Janet Hedtcke are comparable to the favorable experiences of many farmers who raise heifers on pasture.

How the study was conducted

In this trial, pastured heifers were grazed from May to October in groups of four to six head per year on four 0.7-acre subdivided pastures at the Arlington Research Station in Columbia County. The 500-pound heifers (about six to ten months old), which were primarily Holsteins, were randomly selected from the UW Dairy Science herd.

The Arlington pastures included red clover, smooth bromegrass, timothy and orchardgrass. Grazing pressure was adjusted throughout the season as the rate of forage growth changed. For example, in the hot, dry summer months when forage growth slowed, heifers were either given a larger area to graze or moved through the paddocks at an increased rate to maintain intake and body condition, and supplemented with hay if necessary to allow adequate pasture rest and regrowth. Rest periods for the paddocks ranged from 25 to 35 days. If pasture growth exceeded what the heifers could graze, then hay was harvested in the early season as part of the management system. Heifers were fed grain (2.5 lb/hd/day) and had free access to salt and trace minerals.

The confined heifers received a total mixed ration (TMR) that typically included 11 lbs of alfalfa haylage, 5 lbs of corn silage and 5 lbs of a corn, soybean meal, oats and molasses mixture.

Two different data sets were used for these comparisons. From 2000 to 2010, Posner and Hedtcke collected data on ADG over the grazing season for 54 heifers on pasture and 61 confinement heifers. The UW Dairy Science Department subsequently collected first lactation performance data from 2000 to 2009 for 37 of the pastured heifers and 48 of the confinement heifers (fewer animals were included in the second set of data because some animals were sold before the data was collected). The data on the first lactation included milk yield, health issues and age at first calving for heifers when they entered the confinement milking string at Arlington.

Average daily gain

The pastured heifers gained an average of 1.97 pounds per head per day, significantly higher than

Holstein heifers were moved regularly to fresh pasture.

WICST pastures at the Arlington Agricultural Research Station included red clover, smooth bromegrass, timothy and orchardgrass.

the 1.86 pounds per head per day for the confined heifers. The target industry standard for ADG for heifers is 1.8 lb/hd/day, so both treatments exceeded this level. The researchers compared their results with the performance of other grazed heifers and steers. In a prior study from 1992 to 1999, researchers grazed 159 primarily Holstein heifers at two WICST sites at Arlington and Elkhorn. Those cattle were grazed at a higher stocking rate than those in the study described in this brief, and they had an ADG of 1.8 lb/hd/day. They were supplemented with 2.5 lb/hd/day of grain with access to trace minerals.

Researchers also compared ADG results from two nearby farms in Walworth County in southeast Wisconsin, collected over several years. On one cooperating farm—an organic dairy—335 grazed heifers (Jersey-Holstein and other crosses about six to ten months old) receiving no grain gained an average of 1.5 lb/hd/day, both in a leader-follower grazing system with the dairy herd and when grazed separately from the dairy herd. At another southern Wisconsin farm, 206 organic, grass-fed Jersey-Holstein and other dairy-cross steers (also six to ten months old) fed no grain gained an average of 1.8 lb/hd/day. These results show that heifer ADG on managed grazing farms varies, but can be exceptional, especially when weight gain is the priority (i.e. custom heifer operations or steers raised for beef). Different management strategies such as stocking rate, pasture management, and amount of grain fed will affect ADG, and can be manipulated depending on the goals and resources of the producer.

Milk production

Both the pastured and confined heifers were transitioned into confinement for calving and their first lactations. As part of the UW dairy herd, all animals were fed a total mixed ration based on corn silage and alfalfa haylage. The UW Dairy Science Department kept records on their milk production and health. Posner and Hedtcke found that the 37 first-calf heifers that had been pastured averaged 25,328 pounds of milk in their 305-day adjusted lactation, higher than the 23,415 pounds of milk for the 48 cows that had always been raised in confinement. Factors that may have possibly contributed to this higher rate of production in the pastured group include better physical fitness as a result of greater exercise received while on pasture, and their regular handling while on pasture, lowering handling stress during milking.

During eight of the ten years for which the researchers collected first lactation data, confinement-raised heifers had more variable levels of milk production than those that had been pasture raised. While one might expect that more seasonally variable pasture nutritional quality might result in more variable body condition and first lactation milk production of pasture-raised heifers than those raised on a more consistent confinement diet, researchers found that this was not the case in the current study.

Other measurements

The researchers also measured the body weights of the pastured and confined heifers at the end of the pasture season in October, their ages at first calving, and the frequency of displaced abomasums and retained placentas at first calving. The pastured and confined heifers did not show significant differences for any of these measurements.

Hedtcke said, "This research shows that pastured heifers can be as productive as confined heifers when they join the milking string. The pastured heifers met or exceeded our expectations while growing and during their first lactations."

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