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Wheat Stocker Decision Tools

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Abstract: Dual purpose winter wheat is common in the U.S. southern plains. Wheat forage is grazed by stocker calves from late fall to mid winter. After maturity, wheat grain is harvested. This production system has a number of critical decision points. We discuss three new software tools available to Extension educators and wheat stocker producers to aid in estimating stocker returns, assess the economically-optimal gender and weight combination for stockers, and determine the optimal date for terminating the grazing phase of this system.

Introduction

Computerized decision support aids are one of many educational delivery tools available to Extension educators. As early as 1974, Harrison and Rades advocated the use of computers in Extension programming. Numerous authors (e.g., Cloughesy, 1997; Straka & Bullard, 2009) employ computer-based tools in their

Extension toolkits. Here, we discuss three new tools available to Extension educators to assist producers with beef stocker production and marketing decisions.

Dual-purpose (fall-winter forage plus grain) winter wheat production is common in the U.S. southern plains. Wheat that is planted in mid-September may be grazed from mid-November through late winter. If livestock are removed prior to the development of the first hollow stem (FHS) stage of growth, the wheat will mature and produce a grain crop. Most of the wheat pastures are stocked with weaned calves, i.e., stockers. Grazing typically continues through February to early March, depending on weather, location, and variety. Termination of grazing is dictated by FHS, wheat prices, stocker average daily gain (ADG), and stocker prices. If wheat is grazed past FHS, grain yield declines (Taylor, 2007). A complete description of this system can be found in Peel (2006).

Dual-purpose wheat is managed differently than grain-only wheat. It is planted earlier to achieve a greater expected fall-winter forage yield, but the early planting results in a lower expected grain yield than grain-only wheat. Dual-purpose wheat also requires more seed and more nitrogen than grain-only wheat.

There are three critical decision points in the dual-purpose wheat production system. First, is it economically advisable to produce dual-purpose rather than grain-only wheat? Second, the weight and gender combination that is projected to have the highest profit per head and/or per acre must be determined. Prices for heifer calves are lower than steer calf prices. Also, the price slide means that lightweight calves are higher priced in \$/cwt than heavyweight calves. Third, when should grazing end? Grazing past FHS reduces wheat yield but increases calf weights, setting up an economic trade-off. This trade-off is driven by the price of wheat, the rate of decline in wheat yield, the price of feeder calves, and ADG.

The Wheat Stocker Decision Tools were developed to assist producers with these decision points two and three. The tools consist of three programs written in MS Excel 2007. Each of the three programs and their uses are described below.

Wheat Stocker Budget Generator

The Wheat Stocker Budget Generator allows for side-by-side economic comparison of steers vs. heifers at purchase weights specified by the users. A price data file, stored on an OSU server, is updated two to three times monthly. The user may download these local cash prices for feeder calves and feeder futures prices by pressing a key in the spreadsheet. The user may also enter relevant production information plus feed, veterinary, marketing, and other costs.

The program computes expected per head revenue, costs, and profit, as well as profit per acre, and breakeven stocker sale price. For stocker producers who rent wheat pasture, profit per head is the relevant metric. For producers who own wheat pasture and are considering retaining or purchasing stockers, profit per acre is the relevant metric. Wheat producers can use this information in combination with information regarding the cost of the additional seed and nitrogen and cost of the grain yield reduction from early planting to determine if the expected returns from dual-purpose wheat are greater than the expected returns from grain-only wheat.

Wheat Stocker Purchase Planner

The Wheat Stocker Purchase Planner allows for side-by-side economic comparisons for both steers and heifers for purchase weights ranging from 300 to 800 pounds, in 50-pound increments. Relevant production data and costs of gain are allowed to vary by purchase weight and gender. Cash market prices, feeder futures prices, and price forecasts for purchases and sales can be generated from the price files stored on the OSU server by pressing a key in the spreadsheet. Alternatively, the user can enter price information manually.

The program generates expected revenues, costs, and net returns by purchase weight and gender: the purchase weight for each gender with 1) the highest expected return per head, 2) the highest expected return per acre, and 3) the lowest breakeven price. The program provides an estimate of the economically-optimal weight/gender combination for wheat pasture grazing.

Graze Out Decision Aid

The Graze Out Decision Aid, assists in projecting the optimal date to terminate grazing. The model assumes that calves are on pasture, so purchase cost is not relevant to the decision. Only the marginal return from another week of grazing (increased calf value) and the marginal damages (decreased wheat revenue) are relevant. The user enters production data, feeder calf prices, and wheat prices. Expected wheat yield is entered, and two points on a damage function are entered. Lost wheat yield per day of grazing is entered for the first 7 days post-FHS and for the second 7 days post-FHS. This allows for a damage function that resembles the one estimated by Taylor (2007).

The Graze Out Decision Aid also allows users to download feeder futures prices and generate price forecasts for eight sale dates. Alternatively, the user may manually enter expected sale prices. There are five grazing termination dates allowing for wheat harvest: FHS, ± 1 week, and ± 2 weeks. For these five dates grazing rates are held constant. Three more possible sale dates are associated with a "graze out." During graze out, stockers are concentrated in a fraction of the wheat pasture, typically 1/2 of acres. ADG post-FHS is higher as the wheat forage is rapidly growing. However, wheat yield is zero on graze out acres. The program considers three possible graze out start dates: FHS, \pm week, and ± 2 weeks.

Summary

Southern Plains Extension educators often are called on to address wheat stocker issues. The tools presented here use economic concepts to assist with production and marketing decisions in the wheat stocker production system. The tools were developed as joint effort between the Oklahoma Experiment Station and Extension Service. The programs are downloadable from:

<www.agecon.okstate.edu/faculty/publications.asp>.

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