



Consumer Knowledge and Horse Preference for Different Colored Oats

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ABSTRACT

Oats (*Avena sativa* L.) are used for human and livestock consumption. Currently, the market prefers white hulled oats that have a high test weight, which historically were used for equine feed. Plant breeding programs in the Midwest United States produce both white and yellow hulled oats that meet industry standards; however, there appears to be a market preference for white hulled oats even though the hull is removed before processing for human consumption. The perception for this preference is that the horse industry demands white oats. This two-part study was conducted to determine if horse owners and managers, or the horses, had a preference for a specific hull color. To accomplish the first objective, a 13-question survey regarding oat use and preference among horse owners and managers was administered for 6 weeks through the University of Minnesota Horse Extension Team. The 801 survey respondents did not have a visual preference for white or yellow hulled oats ($P = .89$). For individuals who purchased oats, the most important quality was cleanliness, with color and test weight being the least important. The second objective consisted of two horse-feeding trials. The horses did express a preference for yellow hulled over white hulled oats ($P < .0001$). Although horse owners and managers did not indicate a color preference for oats, horses preferred yellow oats. The lack of preference from horse owners and managers suggests that others within the oat supply chain are driving the market to categorize white oats as the premium horse feed.

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1. Introduction

Oats (*Avena sativa* L.) have been a standard grain fed to horses for centuries because of its high palatability, digestibility, and nutritional qualities [1]. These characteristics also make oats a good source of nutrition for human consumption [2]. The lemma, or hull, covers the oat groat (embryo and endosperm) and protects the grain from insect damage and disease [2]. The hull also contains high levels of beta-glucan, which is thought to be beneficial to horses when oat is fed as a whole grain [2]. For human consumption, the hull is removed; however, the groat also contains high levels of dietary fiber compared to other grains. Grain nutritional

traits, both whole grain and groat, have not been found to correlate with hull color.

Modern oat cultivars vary in hull colors ranging from white to yellow to tan and even black. Hull color is postulated to be controlled by a number of genes with epistatic interactions [3,4]. White hull color occurs when all loci for color are recessive, whereas yellow oats require presence of one or two dominant loci. Public (or University) and private plant breeding programs generally release either yellow or white colored oat varieties based on historic breeding stock and the genetic complexity associated with hull color.

Historically, it has been thought that horse owners and equine feed companies prefer white hulled oats. “Pony oats” do not refer to a specific cultivar, but rather a class of oats that are bought and sold at a premium for equine consumption. These oats are white in color with a test weight between 54 and 63 kg/hl [5] and are further characterized by being clean, free of dust and weed seeds, and with a bright appearance. The white color preference in pony oats is thought to enable buyers the ability to detect grain quality related to animal performance [1,6]. Milling oats, used for human consumption, also have similar criteria for grading including the white color [7]. In low oat production years, the willingness of horse

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owners to purchase oats with these characteristics at a premium is thought to reduce the availability of milling oats used for human consumption [1].

For the past 75 years, Midwestern United States public breeding oat programs have concentrated breeding efforts on various agronomic traits including yield, test weight, and grain quality. Technological advancements enable grain elevators to quickly and quantitatively measure grain traits including seed contamination, protein and oil content, moisture, and test weight. All modern oat varieties either meet or exceed test weight and quality criteria for pony oats, with the exception of color. In addition, geographic regions have historically planted and harvested only one color of oat and are reluctant to accept oats with the opposite hull color. Comingling of different colored oats usually results in rejected loads, especially if loads are bound for feed mills that cater to the horse market. The unprecedented preference for white oat is a problem for oat breeders who have focused on superior agronomic and grain nutritional traits, other than color, and may be negatively affecting the horse industry by limited oat use to only white colored oats. Therefore, the objectives of this study are to determine the importance of oat color in horse owner and managers' use of oats and to determine if the horse has an oat color preference.

2. Material and Methods

2.1. Horse Owner and Manager Survey

In February 2017, the University of Minnesota Horse Extension Team administered a 13-question survey regarding oat use among

horse owners and managers. The survey was advertised on the team's Facebook page and electronic newsletter and was available for 8 weeks between February 6 and March 20, 2017. The survey consisted of questions that focused on owner and manager demographics, horse feedstuffs, and oat preferences. Specific oat questions included type of oats fed, purchase location, qualities taken into consideration when purchasing oat, and the respondent's preference of two colors of oat (Fig. 1A).

2.2. Horse Preference (Intake) Trials

All animal experimental procedures were conducted according to those approved by the University of Minnesota Institutional Animal Care and Use Committee (1704–34720A). Two separate horse preference trials with different methods were conducted between July and August (Trial 1) and August and October, 2017 (Trial 2) using six adult, stock-type horses ($526 \text{ kg} \pm 30$, 5.5 ± 0.8 body condition score [BCS]; [9]). Horses had not previously consumed oats; however, they were acclimated to oat consumption for 3 days before the start of trial 1. During both trials, horses were offered oats after 8 hours of grazing and before their ration balancer meal (Enrich Plus Ration Balancing Horse Feed, Purina, St. Louis, MO) fed at 0.1% bodyweight at 1700 hours each day. During both trials, oats did not replace a dietary component but were fed in addition to the horse's normal ration.

Trial 1 was replicated over 20 nonconsecutive days, whereas trial 2 was replicated over 24 nonconsecutive days; excess oats allowed for trial 2 to be extended by 4 days. Trials were not conducted during rain events or on weekend days when labor was

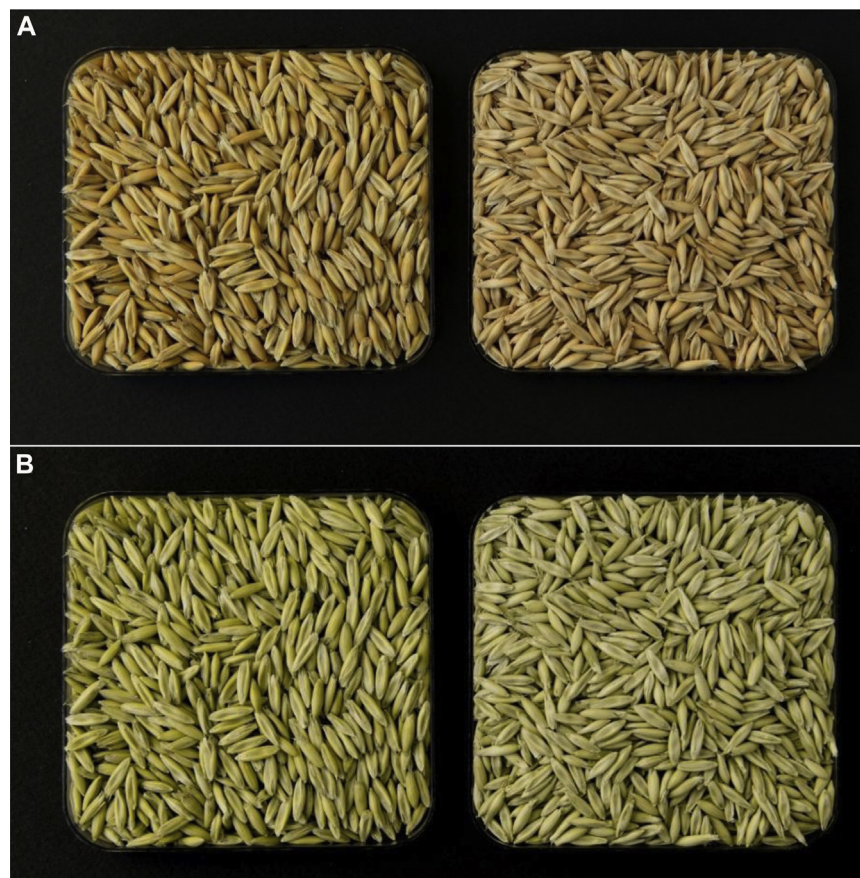


Fig. 1. Oat colors as (A) viewed by humans or (B) viewed by horses (image color was filtered by the “Baby and Animal Vision” mobile application [8]). The left tray contains yellow oat, whereas the right tray contains white oat. Image A was used in the survey to address which oat color was preferred by horse owners and managers.

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