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Inside:

Preventing Metabolic Diseases in Sheep and Goats Starts With Good Winter Nutrition

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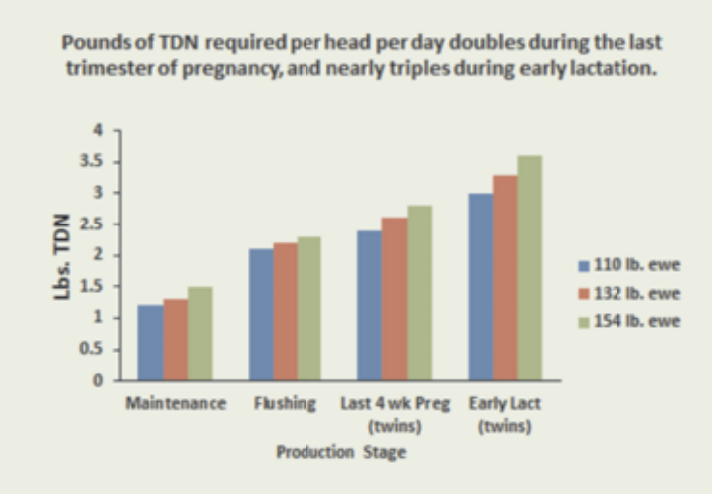
Two of the most important metabolic diseases of small ruminants occur shortly before or soon after birth. Pregnancy toxemia is a common metabolic disease in goats and sheep during late pregnancy. Milk fever, or hypocalcemia, looks very similar to pregnancy toxemia and typically occurs at or shortly after birth, when milk production increases. Although the kidding and lambing seasons do not usually begin until spring, fall is the time to prevent pregnancy toxemia and hypocalcemia in your herd or flock.

So what is pregnancy toxemia? Pregnancy toxemia, or ketosis, is a metabolic disorder caused by the increasing demands upon the body of the doe or ewe during late pregnancy. At this time, the fetuses will complete nearly 80 percent of their growth and the female's nutritional needs double. But the space in her rumen is reduced because of the room taken up by the growing fetuses. If she is unable to consume enough high-quality feed, she will start mobilizing her body fat reserves.



To generate energy from her fat stores, the female still needs a certain amount of blood sugar. Without it, ketones created during fat metabolism build up to toxic levels. A common ketone is the acetone in nail polish remover. Imagine having nail polish remover in your blood! The doe or ewe stops eating, which only makes matters worse. She will become lethargic, have difficulty walking, grind her teeth and eventually go down, followed by coma and death. Her breath will smell sweetish or foul because of the ketones in her blood. Once the female goes down, the likelihood she will recover drops dramatically.

If one of your does or ewes becomes affected, treatment while she can still stand is critical. Provide a high-energy feed to increase the glucose in her blood. You can also give 60 to 90 milliliters of propylene glycol two to three times each day until she recovers or gives birth. In a pinch, you can make a syrup of table sugar or molasses and give it the same way. You may have to abort the pregnancy or have your veterinarian conduct an emergency caesarean section. The female almost always gets right up and is back to normal once the fetuses are removed. Once she goes into a coma, she is unlikely to recover.

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Hypocalcemia is caused by a sudden drop in calcium levels in the blood. Calcium is critical for muscle and nerve activity. Without enough calcium in her blood, an ewe or doe becomes lethargic, has muscle tremors and difficulty walking or goes down. Hypocalcemia and ketosis look so similar that most people treat for both when an animal shows signs of either.

If caught early, hypocalcemia can be treated with an oral gel containing calcium or subcutaneous administration of a calcium solution. More advanced cases require intravenous calcium borogluconate administered by your veterinarian.

Prevention is the best way to handle metabolic diseases. Animals that are most likely to suffer from pregnancy toxemia are fat and carrying twins or triplets. Usually, the older females are more susceptible to pregnancy toxemia than the younger ones. Very thin females are also at risk, but because they have less fat to mobilize, they are less likely to suffer from the condition. Make sure your does or ewes are in good condition (3.5 on a scale of 1 to 5) but not overconditioned.

Feed high-quality hay that will meet your animals' nutrition needs. You can find out the quality of your hay by having it tested ($18). Simply take a core sample from several of your bales using a hay probe, and take it to your Extension office. In Arkansas, your county Extension office can provide you with one to use.

Once you get your results back, the analysis tells you how many pounds of nutrients are in your hay. You need to take a look at your animals' nutritional needs to see if your hay meets them. Small ruminants' nutritional needs increase dramatically during the last trimester of pregnancy and early lactation. Poor nutrition during these critical periods of the production cycle can result in higher veterinary bills and increased death losses of dams and offspring. Proper feeding of your flock or herd this winter will save you money now and go a long way toward avoiding metabolic diseases next spring.

Application of Sire Selection Tools Applied to the 300 Days Grazing Demonstration Herd

Shane Gadberry, Associate Professor

As with any management decision, selecting a sire breed and then a sire from that breed reflects a lot about ranch goals and personal preferences. The objective of this article isn't to promote a particular breed but to demonstrate the thought and management tools implemented for sire selection decisions applied to the 300 Days Grazing demonstration herd at the Livestock and Forestry Research Station near Batesville, Ark.

Without a doubt, the most important aspect of cow-calf production is to have a calf to wean from its dam on a yearly basis; therefore, birth weight and calving ease are highly sought-after economically important production traits. Irrespective of gender and color, greater market weight can be considered the second most important characteristic with greater value placed on moderate to large frame cattle with a USDA muscle score 1. However, calves are not always produced for terminal market. For some ranches, breeding may be directed to produce heifers that will represent the next generation of females in the cow herd. Therefore, too much emphasis on low birth weight or too much emphasis on greater weaning and yearling weights may result in producing females that no longer fit production goals, requiring these females to exit the cow herd early due to dystocia, excessive body size or inability to maintain sufficient body condition through early lactation to rebreed.

Beginning year 1 (2008) of the 300 Days Grazing demonstration herd, the cows were predominately Balancer (Angus × Gelbvieh) females bred back to Balancer bulls, and weaning weight averaged slightly less than 420 pounds. Dams were, on average, 4 years of age and weighed 1,023 pounds with a body condition score 5.5 (BCS, based on a 9-point scale) at calf weaning. The cow weight was not reflective of an average mature weight, since cow maturation has not plateaued until 5 years of age. During the subsequent five years of breeding, Hereford sires were used. Hereford sires were chosen to compliment the Angus × Gelbvieh base herd genetics with the option of retaining females for replacements. The desire was to produce predominately black or black baldy type calves that receive a premium in the market; however, it was not known how many cows would be homozygous or heterozygous black. Over the five-year period of using Hereford sires, the average adjusted weaning weight was 40 pounds per calf greater than the weight observed in year 1. While the first-year calf crop's weaning weight data could be attributed to environmental factors as well as sire influence, the calves produced in subsequent years were an improvement.

Now, fast forward to the years 2013 and 2014. Cows in the herd are now a little older (6.9 years of age, on average) and heavier (1,112 pounds at weaning with a BCS 5). Over time, replacing culled cows with cows from various sire backgrounds (Balancer or Charolais from other research station projects or Hereford from the 300 Days Grazing herd) has increased the variation in cow coat color in the herd. The cow herd is now producing about 50 percent black-hided calves with the rest predominately red.

In 2013, a decision was made to change sire breed from Hereford to Brangus. The ideas behind using Brangus included 1) increasing the percentage of black coat color calves

for sale, 2) trying to improve the base cow herd over time by keeping replacement heifers that would have a small percentage of Brahman influence and 3) improving milking ability. In 2013, the cows underwent an estrous synchronization protocol followed by timed artificial insemination (AI) to a Brangus sire. Cows that did not conceive AI were given the opportunity to breed by natural service to a Hereford sire.

One of the tools used to determine the traits desired in selecting a Brangus sire was across-breed EPDs (expected progeny differences). One goal was not to over-emphasize a low birth weight EPD with breeding mature cows and the second was to select a Brangus sire that had comparable adjusted EPDs as the Hereford sires previously utilized. Table 1 illustrates the average EPDs for the Hereford sires used for the 2012 breeding season, the EPDs of the Brangus sire chosen and the across-breed adjusted EPDs for comparison.

Based on the adjusted EPDs, the chosen Brangus sire should produce a calf with comparable growth traits as the previous Hereford sires; however, there appears to be more potential for growth of calves from the daughters (MILK EPD difference) of the Brangus compared to that of the Herefords previously used. Given that calving difficulty has not been a problem in the past, the Brangus sire was not expected to increase the odds of dystocia. The cows are currently calving; therefore, it won't be until April until it is known how well this first set of calves develop through weaning.

While the first set of cows have not finished calving, it is already time to begin planning the 2014 breeding program. Unfortunately, semen from the Brangus bull used in 2013 will not be available. The challenge becomes finding a Brangus sire that is comparable to the sire used in 2013 for birth, growth and milk EPDs. Some Brangus bulls are utilized for their low birth weight and high calving ease EPDs. While the genetic trend for Brangus has been increased weaning weights with relatively no change in birth weight, care must still be taken in sire selection to ensure that utilizing a low birth weight, high calving ease sire with mature cows is not consequently reducing weaning and yearling weights of calves.

Comparing EPDs within breed definitely requires less work than across-breed comparisons. An advantage with comparing AI sire EPDs is greater accuracy. The EPDs for Hereford sires used in the past were based on pedigree with no reported offspring. For AI sires, EPD accuracy improves as those sires are used within the breed and offspring performance data is reported back to the breed association. Accuracy is important from the perspective that as accuracy increases, the amount of possible change decreases. Table 2 contains the EPDs, EPD accuracy and associated possible change in EPD for two alternative sires considered for 2014 compared to the sire utilized in 2013. As indicated earlier, a change in weaning weight EPD from 0.59 to 0.84 is an improvement in accuracy by 3 pounds.

Accuracy is helpful from the perspective of identifying both proven sires and factoring in possible change in the reported EPD for the selection decision. For example, the cost difference per unit of semen between options 1 and 2 is $20 per cow for the 46 cows that will be bred AI in the demonstration herd. The semen cost per pregnant cow will vary depending on typical AI pregnancy rate. Assuming a 60 and 80 percent pregnancy rate and 100 percent calf survival to weaning,

Table 1. Comparison of 2013 Hereford and Brangus EPDs and across-breed adjusted EPDs

Sire	BW EPD	WW EPD	YW EPD	MILK EPD
Hereford (average)	3.6	52	91	23
Brangus	2.0	35	57	17
Adjusted Hereford	6.3	49	67	6
Adjusted Brangus	6.5	50	63	23
Adjusted difference Brangus-Hereford	+0.2	+1	-4	+17

EPD = expected progeny difference, BW = birth weight, WW = weaning weight, YW = yearling weight, MILK = additional weaning weight of daughter's calf.

Table 2. EPDs, accuracies and possible change comparison for Brangus sires used (2013) or considered (2014) for artificial insemination

	BW EPD	WW EPD	YW EPD	MILK EPD
2013 Sire				
EPD	1.6	32	48	14
Acc	0.90	0.84	0.84	0.42
Chg +/-	0.3	3	4	5
2014 Option 1				
EPD	2.7	30	58	16
Acc	0.71	0.59	0.57	0.28
Chg +/-	0.8	6	8	7
2014 Option 2				
EPD	1.4	38	68	17
Acc	0.84	0.74	0.72	0.26
Chg +/-	0.6	4	6	7

EPD = Expected progeny difference, Acc = accuracy, Chg = change, BW = birth weight, WW = weaning weight, YW = yearling weight, MILK = additional weaning weight of daughter's calf.

the semen cost per cow that weaned a calf from AI is outlined in Table 3.

If the EPDs are correct, the expected difference in weaning weight due to sire is 8 pounds (38 – 30). However, accounting for accuracy differences and associated possible change, a difference of 18 pounds [(38 + 4) – (30 – 6)] can't be ruled out. The additional weight is worth about $28 at today's price. The difference in the value of additional weight weaned in comparison to the additional semen cost per pregnancy indicates the sire performance difference may not be sufficient enough to justify the additional semen cost on the basis of weaning weight goals alone.

As initially stated, selecting a sire breed and then a sire from that breed reflects a lot about ranch goals and personal preferences. The objective of this article wasn't to promote a particular breed but to demonstrate the thought process and management tools implemented for sire selection decisions applied to the 300 Days Grazing demonstration herd at the Livestock and Forestry Research Station near Batesville, Ark. These tools included application of artificial insemination, evaluating general characteristics of different breeds, application of across-breed EPDs and utilization of accuracy and possible change in EPD within a breed. Additional tools that have not been implemented for making breeding and selection decisions include application of sexed semen technology and genomic analysis. One challenge some cattle producers are beginning to recognize is a reduction in purebred terminal type sires and an increase in composite sires from these traditionally terminal breeds. Across breed EPD adjustments are currently limiting in this area. For more information regarding on-farm application of these technologies, visit your local county Extension office.

Table 3. Semen cost per pregnancy for 46 cows

	$20 per unit	$40 per unit
60% Pregnancy Rate	$33	$66
80% Pregnancy Rate	$25	$50

Managing Hay for Quality in Rainy Climates

Paul Beck, Professor

When harvesting hay, generally our goal is to cut, rake and bale the crop so we are producing a leafy, palatable stored forage that will get our cows and other livestock through the winter in the best possible condition. In visiting with hay producers this summer, I have heard several times that the rain we received this summer has complicated hay harvest tremendously. Rain is necessary for our forage crops to grow, we all know that. But to harvest hay in the best conditions, rainfall can certainly cause problems. Rain washes away the highest quality, most digestible portion of the curing forage plant – the soluble proteins and sugars. Furthermore, the impact of a raindrop can shatter leaves (the highest quality and most digestible portion of the forage plant) and the leaves are left lying on the ground when we are finally able to bale. If we rush the baling process and bale it too wet, the hay will go through heating (binding up the sugars and proteins making them indigestible – this occurs when we have caramel smelling hay) and produce mold (the mold spores consume the soluble sugars and proteins leaving us a dusty, low-quality mess). Because of all these concerns, several producers indicated that the first cutting of some of their hay meadows was harvested in late July or early August.

As forage matures, protein content of our warm-season grasses will decline slightly, but neutral detergent fiber (NDF) and acid detergent fiber (ADF) will increase dramatically. The NDF and ADF content is what determines the digestibility of the forage, and as it increases, energy content and hay intake decrease. High fiber forages (forages with high levels of ADF and NDF) are harder for the microbes in the rumen to break down and thus stay in the rumen longer. Because these forages are in the rumen taking up space for a longer period of time, intake and digestibility of the forage declines as fiber goes up. Unlike many other hay-producing areas that produce large amounts of clover or alfalfa hay, Arkansas production is dominated by perennial grasses (mostly tall fescue, bermudagrass, or bahiagrass). Leaf shatter is a big concern with legume hay and other leaf grass crops (like orchardgrass), but this is a minor concern with most of our hays. So, hay quality of a particular forage is determined more by harvest interval than almost any other management factor we control.

A well-managed bermudagrass hay field (fertilized and cut on a 28-day interval) will produce hay that is 12 to 14 percent crude protein and 60 to 62 percent total digestible nutrients. This quality of hay will be adequate for beef cows in any stage of production with no supplemental protein or energy. Research at the University of Arkansas in Fayetteville (Table 1) indicates that a rainfall event (3 inches) on bermudagrass that has reached 13 percent moisture (ready to bale) will have little effect on the protein content of the resulting hay when it is finally ready to bale again but will increase neutral detergent fiber by 1.5 percentage units and increase acid detergent fiber by 2 percentage units; this decreases the TDN content of the hay by 1.5 percentage units. But what if we were to wait for a rain and allow the hay to grow

more, wouldn't that be a good thing all the way around? We are increasing yield and not getting the hay rained on if we wait 14 more days (to a 42-day harvest interval) and allow this same bermudagrass to grow longer. Protein declines and the fiber increases (as shown in Table 1). This decreases the TDN by 6.5 percentage units from 64.9 to 58.5 percent (this quality of hay would be fine for most cows even those that have a calf ~~on their side~~). If we delay another two weeks, we lose 15 percentage units of TDN and have hay that is frankly not worth baling (8 percent crude protein and 44 percent TDN, which will not meet the requirements of many animals).

Even a short delay in harvest of our warm-season grasses will have more negative impact on hay quality than a single rainfall event (this research looked at rains of 0.5 to 3 inches with similar results). Since a delay in harvest of one cutting will delay the harvest of the next cutting, it can be said that a long delay not only decreases the quality of this harvest it also impacts on the yield and quality of the next harvest. Dry matter loss from the rained on bermudagrass was only about 2 percent, where DM loss of orchardgrass was four-times greater. Leaf loss and loss of soluble sugars and proteins from bermudagrass is negligible, while these losses are a much greater concern with other forages. The warm-season grasses we rely on for hay in Arkansas really do not have much soluble sugars and proteins to lose and leaf shatter is minor. In summary, it is probably better to harvest at the right time than have a long delay in harvest, but if hay does get wet, it is probably better to let it dry completely than bale early (at too high moisture content) and deal with heating (caramelization and fire concerns) and mold issues.

Table 1. Effect of Rainfall and Harvest Interval on Nutritive Quality of Bermudagrass Hay in Fayetteville Arkansas, 2004

Harvest Interval	Crude Protein	NDF	ADF	TDN
28-day harvest	15.4	71.5	31.7	64.9
Rained on 28-day harvest	15.6	72.9	33.7	63.5
42-day harvest	12	76	38	58.5
56-day harvest	8	78	43	43.6

Razorback Stallion Service Auction

Mark Russell, Assistant Professor

Coming this winter, the Razorback Stallion Service Auction will take place online and will assist the Arkansas 4-H Horse Program as well as the University of Arkansas Horse Judging Team. We have a variety of cutter, working cow, halter and pleasure stallions. These breedings will be available for 2015.

For the 4-H Horse Program, proceeds go primarily to fund:

- Scholarships
- Internships
- Learning opportunities such as camps and workshops
- National travel to various competitions
- Equipment for activities
- Books and other learning tools for 4-H Horse Clubs in Arkansas

For the U of A Horse Judging Team, proceeds go primarily to fund:

- Travel costs associated with judging competition
- Registration fees
- Scholarships

Roster as of September 10, 2014

HIGH BROW CD	NEAT LITTLE CAT	DUAL R SMOKIN
SPOTS HOT	HOLD THAT COW	LENA PEPTOLENA
DOUBLE UP NVESTMENT	MISSISSIPPI CAT	ENQUEST
SL ALLIANCE	CERTAIN POTENTIAL	STYLISH REY GAY
MANDALAY REY	MONARCAT	TR DUAL REY
A DREAM REMEMBERED	LOTTASHINEYCASH	TRAVELIN JONES
FANTASTIC CAT	HYDRIVE CAT	BAMA CAT
LAKER DOC		

4-H Horse Program activities are designed to teach youth leadership, responsibility, pride, respect, initiative and self-reliance. The 4-H Horse Program provides dedicated, hard-working youth with an opportunity to learn the tools to enhance horse ownership. Participants in youth programs develop skills in communication, decision making, problem solving, self-discipline, self-motivation, teamwork and organization. All of these have proven to be important factors to the participants in career preparation.

A University judging team offers students a rare opportunity to receive a head start into the horse industry before leaving college. Students gain knowledge in areas such as evaluating, decision making, communicating, and teamwork among other benefits. These students receive a "leg up" on the competition when seeking employment in the equine industry. Team members also develop contacts while on judging trips to the AQHA World Show, AQHA Congress, NCHA Triple Crown Events and the NRHA Futurity, along with other regional judging contests. These contacts will be a valuable resource as they continue their endeavors after college.

We hope this auction will continue for many years and become a tradition in Arkansas. A big thanks to Lewis Wray and Chad Vanlandingham for their help in getting quality stallions for the auction.

To keep up with the latest information, go like our Facebook page: "Razorback Stallion Service Auction." To learn more about the Razorback Stallion Service Auction, go to http:// www.uaex.edu/farm-ranch /animals-forages/horses/.

For specific questions, contact Mark Russell at 501-590-5748 or mrrussell@uaex.edu.

Forage Brassica Variety Trial in Northwest Arkansas

K. Simon, D. Philipp, S. Jones, J. Jennings and R. Rhein

In the southern U.S., brassicas are an attractive choice for fall and early winter grazing for beef cattle, as brassicas are fast growing and high in nutritive value, thus complement the existing forage base and can close gaps in forage production. *Forage brassicas* is a general term for a group of species, including kale, rape, swede and turnips, that can be used to a larger or lesser extent as forage. The objective of the study was to test turnip, rape and hybrid cultivars for dry matter yield and canopy heights.

Two replicated research trials were conducted at the University of Arkansas Watershed Research and Education Center (WREC) in Fayetteville. Eight cultivars of forage brassica and a commonly used food plot variety, Seven-Top, were tested in two studies for dry matter production after two and four months (regrowth study) or only four months (stockpile study) of growth. The eight cultivars compared in the trial were Appin and Barkant (turnips); Barsica, Bonar and Winfred (rape); and Pasja, T-Raptor and Vivant (turnip hybrids). Appin, Bonar and Pasja are products of Ampac Seed Company. Barkant, Barsica and T-Raptor are products of Barenbrug Seed Company. Vivant is a product of Mountain View Seed Company, and Winfred is a product of PGG Seed Company.

Brassicas were no-till planted on a well-firmed, disked seedbed on Aug. 26, 2013. It should be stressed here that the quality of site preparation is of utmost importance for successful stand establishment and growth. Seeding rates were 5 pounds/acre for all cultivars. Pre-formulated NPK fertilizer and boron were applied to each plot using soil test reports and recommendation for brassica production.

Initial dry matter yields for the regrowth study ranged from 1,034 to 2,112 pounds DM/acre at the Oct. 22 harvest date, with Winfred yielding highest and Appin lowest (Figure 1). At the second harvest for regrowth on Dec. 3, Winfred showed the lowest amount of regrowth along with Seven-Top of less than 250 pounds DM/acre. Dry matter production of Pasja with 699 pounds/acre was the highest observed for the second harvest. Yields for stockpiled, only harvested on Dec. 3, ranged from approximately 3,300 to over 5,500 pounds DM/acre (Figure 2). Winfred (5,536 pounds DM/acre) was similar to Bonar and Barsica but out-yielded all other cultivars.

Canopy heights ranged from less than 5 inches in early September to almost 30 inches in the stockpile study by mid-November (Figures 3 and 4). Brassicas grew approximately 5 inches per week between Sept. 18 and Oct. 16. Regrowth after the Oct. 23 harvest barely reached 10 inches for some cultivars.

Forage turnip produces a high proportion of leaf yield, have good bulb yield and have good regrowth ability. Forage turnips have a mature height of 20 to 22 inches. Appin produces a small, round bulb (< 5 inches) firmly anchored in the soil. Barkant produces a moderate,

Figure 1. Dry matter yield results for brassica varieties (regrowth study). Harvested on October 22 and again on December 3.

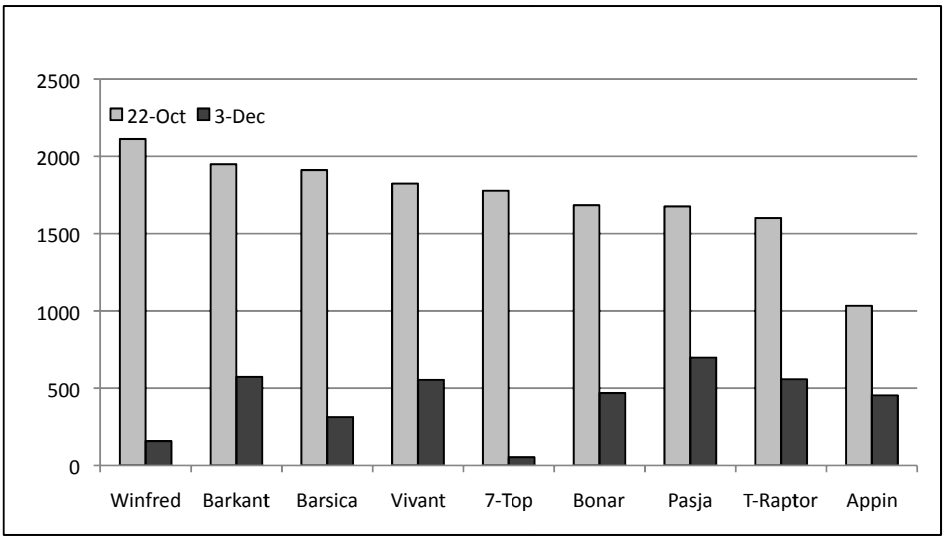


Figure 2. Dry matter yield results for brassica varieties (stockpile study). Harvested on December 3.

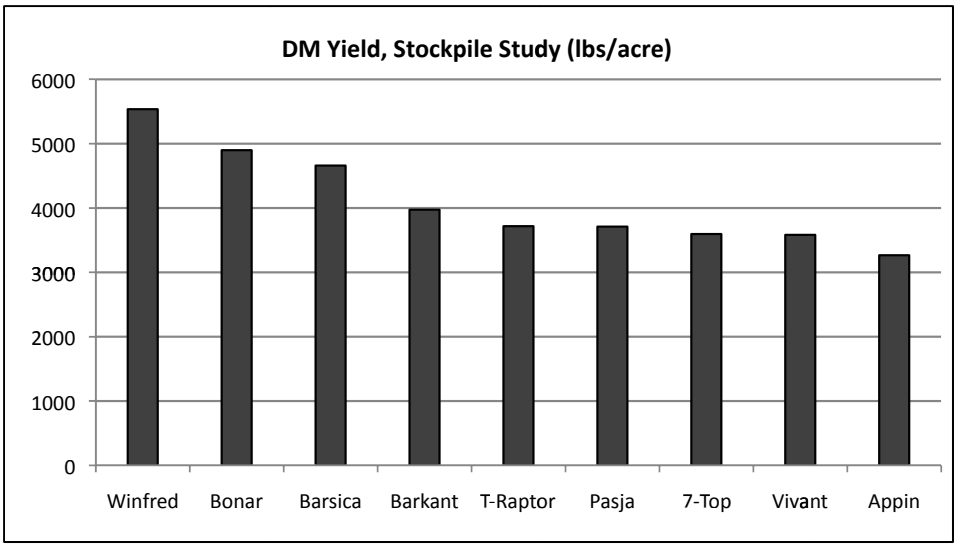


Figure 3. Canopy heights recorded from the regrowth study.

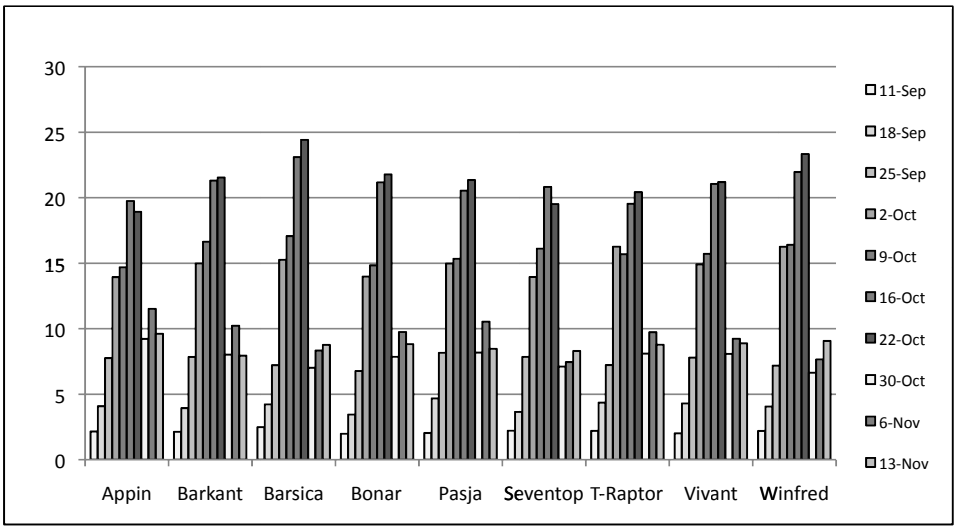
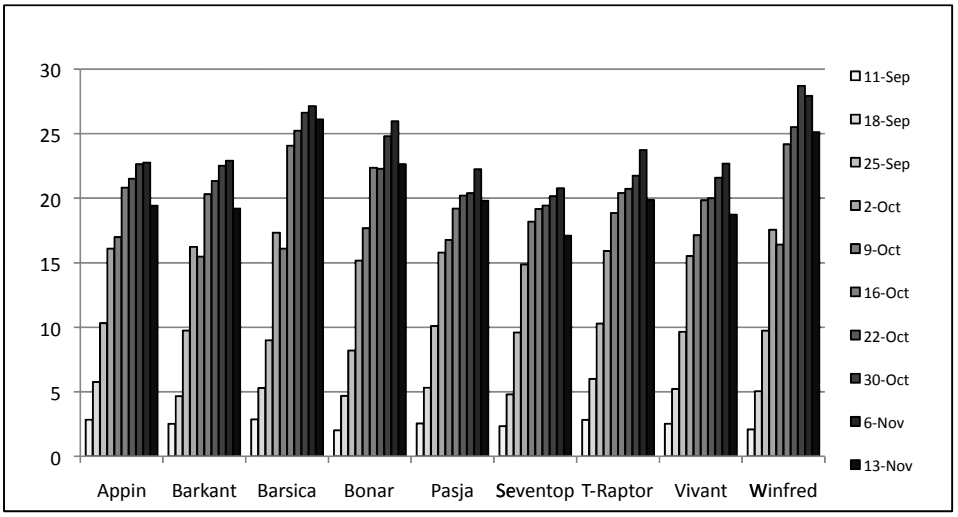


Figure 4. Canopy heights recorded from the stockpile study.



oval-shaped bulb (4 to 8 inches), with 50 percent of the bulb on top of the ground. Yield from bulb production averaged 2,900 pounds DM/acre. Forage quality of the bulbs was 10.5 percent CP and 79 percent TDN. Forage turnip may be rotational grazed or stockpiled. Appin is better suited for rotational grazing than Barkant.

Forage rape produce large paddle-like leaves with excellent leaf yield, with a mature height of 26 to 28 inches. Forage rape have limited regrowth ability and is, therefore, best suited for stockpiling. Bonar is more susceptible to frost injury than other forage brassicas.

Forage turnip hybrids have a high leaf-to-bulb ratio, are leafier than other brassicas, have excellent regrowth ability and have excellent yield potential. Forage turnip hybrids have a mature height of 22 to 24 inches. Forage turnip hybrids are suitable for rotational grazing or stockpiling. Total yield potential may be increased with rotational grazing.

Seven-Top turnip is commonly used as a vegetable crop but has a history of being used as a forage crop for small ruminants and deer food plots in Arkansas. Seven-Top produces fast, vigorous leaf growth. However, leaf yield from Seven-Top is less than the forage brassicas due to less leaf area and more stems. Seven-Top produces no regrowth and is more susceptible to frost injury than the forage brassicas.

Relatively large differences exist among brassica species and cultivars in terms of dry matter production. Some of the cultivars that showed high yields in the stockpiled study, such as Winfred, showed relatively little regrowth when cut earlier in the season, while the variety Pasja for example showed the reverse. Producers should carefully select varieties and consult yield test data for optimum growth and performance of forage brassicas on their operations.