

# Forages and the weaned calf: When, how and how much should be fed?

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Since calves are the animals most vulnerable and sensitive to change on a dairy, transitions are critical for calves. Just because they are weaned does not mean calves are now home free without issues. In fact, the month after weaning is really a transition period for calves.

Functional rumen development is critical for calves to be able to handle forage in their diet. If not properly done, rumen fill can occur, which distorts true body growth and can reduce intake and daily gains, too. Let's address several questions. How much forage should be fed, in what form, and when should it begin being fed and then increased?

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A study used weaned Holstein steers with initial bodyweights of 150 pounds at an age of 58 to 59 days. There were two trials with four treatments using 12 calves per group: starters with either low-starch, pelleted physical form blended with 5% chopped grass hay and fed

free choice; or a high-starch, textured starter blended with 5% chopped hay fed free choice. The low-starch pelleted starter was limit-fed to 4.4 pounds dry basis daily with free-choice long grass hay; or the high-starch textured starter fed up to 4.4 pounds dry basis with free-choice long grass hay.

<b>TABLE 1</b>	Calf performance parameters during days of age from about 60 to 96			
	Chopped hay textured starter	Chopped hay pelleted starter	Long hay textured starter	Long hay pelleted starter
Dry matter intake, lb/day	6.14	5.95	5.00	5.02
Starter DMI, lb/day	5.86	5.88	4.18	4.29
Hay DMI, lb/day	0.29	0.29	0.81	0.73
Daily gain, lb	2.29	1.98	1.96	1.59
Hip width increase, inch	2.28	1.92	2.01	1.81

Total dry matter intake (DMI) and starter DMI decreased with long hay treatments, while hay DMI increased with long hay treatments (**Table 1**). This partially reflects that starter DMI was limited to 4.4 pounds daily, so it might be expected that calves would then increase free-choice long hay intake. Daily gain was greater for the chopped hay treatments and for textured versus pelleted starter treatments. Likewise, hip width (reflecting bone growth) increase was greater for chopped hay and textured starter treatments. Chopped hay treatments also had increased body condition scores, but these were not different for the two starter treatments.

Results from Trial 2 were similar to Trial 1 in that total DMI and starter DMI were increased when hay was limited to 5%, while long hay intake then increased when starter was limited to 5.17 pounds dry matter daily. Hip width and body condition score were also increased when calves were fed 5% chopped hay mixed with the textured starter versus limit fed starter with free-choice long hay.

In trials like this, it would have been good to have had gut fill measures. Unfortunately, the best way to do that measure is by slaughter, which is not an option in most calf trials. Looking at all the data, the odds are where long hay was fed and hay intake versus chopped hay increased, there most likely was more gut fill with long hay. And, that greater long hay decreased starter intake resulted in both decreased daily gain and hip width increase. Additionally, notice that both daily gain and hip width increases decreased for pelleted

versus textured starter treatments. This is indicative that too much forage too soon is not well handled by calves within this age range. So, it is best to limit hay intake to about 0.5 to 1 pound in the month after weaning, to chop the hay and to use a textured versus a pelleted starter.

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A Penn State study used 40 post-weaned Holstein calves beginning at 7 weeks old through 14 weeks old. They had been previously weaned after 6 weeks old. The diet consisted of a texturized starter and 15% coarse-chopped grass hay. The texture was from 18.6% roasted flaked corn and 2.6% whole oats. That is only about one-half of what I think a well-texturized starter should contain. In another study, a starter labelled as “texturized” contained on an as-fed basis, “57.5% concentrate pellet, 14% flatted barely, 13% flatted oats, 10% steamed corn and 3.5% molasses.” That starter was inadequate to keep rumen pH from being above 5.06. And, when hay was also provided, while calves had similar bodyweights, the hay increased gut fill by 10.4 pounds, distorting true body growth.

<b>TABLE 2</b>				
Treatment week	0	8	10	12
Initial weight, lb	148.4	135.6	133.4	136.3
ADG, lb	2.55	2.29	2.51	2.55
EBWG, lb	2.36	2.05	2.25	2.29
Initial hip width, inch	8.11	7.76	7.72	7.76
Hip growth, inch	0.33	0.30	0.32	0.33
DMI, lb/day	6.78	6.14	6.50	6.63
Grass hay	0.51	0.86	0.75	0.59
Starter	6.27	5.28	5.72	6.01
Feed efficiency	0.39	0.38	0.41	0.40

EBWG is predicted empty bodyweight gain.

At first glance (**Table 2**), there seems to be little differences among treatments in daily gain, hip growth, DMI and feed efficiency, although it appears that the eight-week treatment was a bit lower than the other treatments in these areas. But, calves fed grass hay in total mixed rations (TMRs) had more grass hay intake than when that hay was fed separate from starter. All of this might indicate that calves first fed the TMR at 8 weeks old did not have adequate rumen development to handle the 15% grass hay in TMR form, as




opposed to the later introduction of grass hay in TMRs. On the other hand, it could be that calves first fed the TMR at 8 weeks old had a more desirable daily gain at 2.29 pounds than the other treatments around 2.5 pounds daily gains. Those daily gains are more likely to result in over conditioning and some fattening. Or, perhaps this indicates that calves provided TMRs after 8 weeks old were better able to handle 15% grass hay; and if had been increased to above 15%, that would have decreased daily gain to a more desirable 2.25 pounds, as seen with the eight-week treatment.

Digestibilities were also measured at weeks nine, 11 and 13 for all treatments. In general, acid detergent fiber (ADF) and neutral detergent fiber (NDF) digestibilities were greater for calves fed TMR than for those fed components separately, most notably at the nine-week measurement. That is most likely because when the starter was consumed separately, it would have resulted in faster fermentability in the rumen, a lower pH and, consequently, lower fiber digestion at that lower rumen pH. Rumen pHs progressively increased as introduction of TMRs were delayed from 8 to 12 weeks old.

Whether the starter is texturized or not can affect results when rumen development and function is in its early phase. Similarly, Overvest et al., 2016 fed a texturized starter in their study related to TMR or components fed separately or mixed.

Providing more hay (long) than 5% of total intake along with starter for Holstein steer calves from 3-4 months old reduced intake, daily gain and probably increased gut fill as well. There may also be a safety margin in continuing to feed a textured starter during this transition period with introduction of forage and increasing forage level in the ration. That is why I recommend limiting forage to 1 pound daily during month 3, along with free-choice textured starter and then increase the forage to 2 pounds during month 4, along with a pelleted grower.

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Introducing the 15% hay mixed with starter in a TMR at 8 weeks old post-weaned rather than waiting until 10 or 12 weeks old seemed to be the best timing. Waiting later may lead to some over conditioning, unless the hay would be increased to more than 15% in the TMR. 

*References omitted but are available upon request. [Click here to email an editor.](#)*

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