Increasing the Drying Rate of Alfalfa Hay

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One of the greatest challenges for hay and forage growers is to get the crop cut and into storage before it is damaged by rain. Equipment cost, capacity, and reliability are key considerations. Equally important is the impact that the equipment will have on the drying rate while minimizing leaf shatter and quality loss.

When a high yielding hay crop is cut and laid in a windrow has a tendency to pack down. The hay dries slowly because fresh, drier air does not circulate easily through the windrow and moisture from the hay and the ground become trapped in the windrow. Hay that gets rained on may form a mat which will not dry quickly. When harvesting alfalfa or grass forages, the goal is to reduce the moisture as quickly as possible from about 80% the mid-60's for silage and below 20% for dry hay. Hay growers have several options speed the drying rate: conditioners, tedders, windrow inverters, and rakes are most common.

Most tedders in use today are the rotary-type with vertical fingers that extend from horizontally rotating hub that lifts and fluffs the swath or windrow. Losses from leaf shatter tend to be quite low in grass hay when the moisture content is greater than about 40%, but alfalfa is more easily damaged and for best results alfalfa hay should be 60% moisture or greater when tedding. Usually, this means within about hours of mowing, or soon after a rain, and tedding only when necessary loosen and fluff heavy yielding crops or wet, packed down swaths and windrows.

Windrow inverters treat hay more gently than a tedder. Hay inverters are designed pick up a swath or a windrow and turn it over so the drier hay at the top is placed on the bottom, and the high moisture hay from the bottom is placed on top. Some hay inverters can also be used to combine two or more windrows into a single, large windrow to improve harvest capacity. Hay inversion can reduce drying time by a few hours and causes less damage than tedding.

Conditioning and manipulating the crop does not dry the crop, rather can facilitate natural processes that remove moisture from the hay. Probably most important is the energy of sunlight aided by warm temperatures and low relative humidity. Open, airy windrows are most effective at collecting solar radiation and allowing fresh, dry air to circulate through the crop thereby removing the moisture and drying the hay.

Figure 1. Trial 1, 0.4" of rain overnight.

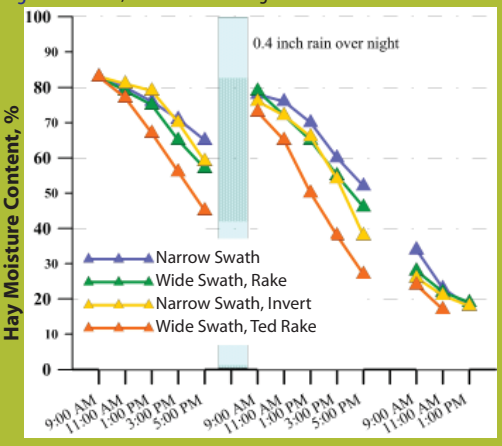
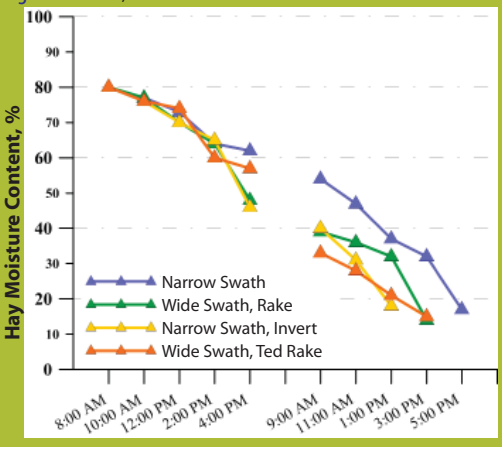


Figure 2. Trial 2, rain was not a factor in this trial.



In an alfalfa hay drying trial in central Michigan, side-by-side comparisons were made of the drying rate of four hay handling methods: 1) Hay placed in a wide swath when cut and raked prior to baling (about 30% moisture), 2) Hay placed in a windrow when cut, not raked prior to baling, 3) Hay placed in a swath and tedded within three hours of mowing, raked prior to baling, and 4) Hay placed in a windrow at mowing, inverted at about 30% moisture. All hay treatments were mechanically conditioned with a rubber roll conditioner. The crop was second cutting alfalfa yielding 2.25 tons/acre of 12% moisture hay.

Results

In Trial 1 (Figure 1) the hay was cut at 9 a.m. in good drying conditions. Hay placed in a wide swath and tedded within a few hours of mowing dried to about 45% moisture by 5 p.m. the first day. The hay left in a narrow swath dried to about 65% moisture while the raked and inverted treatments were about 60% moisture. Following 0.4" of rain overnight, hay with each of the handling methods was about 75%-80% moisture at 9 a.m. All treatments but the hay inverter were raked at 12:30 p.m., and the inverter treatment was inverted. Despite wet ground, drying conditions were good on day two and the tedded treatment dried to 27% by 5 p.m. The inverted hay was 38% moisture at 5 p.m. and the other treatments were about 10% greater. The tedded hay was ready for baling about 11 a.m. and the other treatments were ready a couple of hours later.

Trial 2 (Figure 2) was mown on the second day and rain was not a factor. The inverted windrow was ready to bale at 1 p.m. the day after it was cut. The tedded hay (1:30 p.m.) and the hay laid in a wide swath at mowing (2:30 p.m.) were ready to bale soon after. The last treatment ready to bale (5 p.m.) was the hay placed in a narrow windrow and untouched until dry.

Poor weather often limits rapid hay drying. Tedding, inverting, or otherwise manipulating alfalfa hay can increase the drying rate and is usually most effective in first cutting when yields are high and drying conditions are less favorable. Placing hay in a full-width swath provided maximum exposure to sunlight and air movement and resulted in rapid moisture loss.