

Rapid Drying Shortens Harvest Window, Ensures Quality & Limits Rain Damage

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At cutting, the crop is generally between 75-85% moisture. Plants maintain tissue growth and maintenance after cutting by utilizing energy (e.g., sugars, starches) produced during photosynthesis in a process known as respiration. The respiration rate is highest at cutting and gradually declines until plant moisture content has fallen below 40%. Therefore, rapid initial drying to below 40% moisture will reduce loss of the valuable components, resulting in more total digestible nutrients retained in the harvested forage.

The most important factors affecting how fast hay dries are solar isolation, temperature, soil moisture, and swath density. Wind speed and relative humidity also affect drying rate, but to a lesser degree. So what does this mean? Well, it significantly narrows the number of variables. Actually, the only parameters producers have control over are swath density and, to a lesser degree, soil moisture. Swath density can be changed by laying the crop over a smaller or larger area. In other words, how wide the crop is laid out determines the swath density.

Laying crop in a wide swath is the most important thing a producer can do to speed hay drying. Wide-swaths will minimize swath density and maximize the crop's exposure to the sun (solar isolation) and temperature, all of which are factors important to rapid drying of hay. So, why haven't producers always laid crop in a wide-swath? First, pickups on harvesting equipment (e.g., forage harvesters, balers) were not designed to pick up wider swaths, so a second raking or merging operation was needed, adding cost and energy to the process. In dry-hay production, this cost was not a concern, because the raking process was needed to reach desired harvest moisture. In silage systems, such thinking is changing as the need to consolidate crop for today's high-capacity forage harvesters is considered. Second, swath width was limited to fit between tractor tires, because research has shown, running over the windrow is detrimental to hay drying. This limitation was not as much of a concern when a 9' mower was producing an 8' swath (88% width). But now, a 16' or 18' mower that lays that same 8' swath results in only 50-44% of the cut-width able to absorb the incoming sunlight, resulting in higher swath densities and lower drying rates.

Consider the second factor, soil moisture. Although soil moisture cannot be directly controlled, the ground can be allowed to dry before cutting (although maturity and weather will always be the most important factors when deciding when to cut). Some producers prefer to windrow the crop for a day which allows drying of the soil between windrows. However, research shows this approach forces the crop to dry slowly at first, because less of the crop is exposed to the sun. In a 1988 study, Patty concluded the drying rate was improved by 42 and 28% with tedding, when narrow windrows were tilled at cutting compared to the next day. In a later study, Shinnars (2006) used tedding to produce a full-width, conditioned swath at cutting and showed that it has a positive effect on drying compared to tedding the next day.

To minimize swath density and improve drying, set machinery to lay the widest swath possible without running over the windrow. If rain is a problem, tedding may help, but start sooner than later.