High-Capacity Mowers for High-Quality Forage

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As the dairy industry evolves and becomes more management intensive, dairymen will demand more high quality forage. Production of high quality forage is directly linked to productive and efficient harvesting equipment. Recently, greater cutting productivity is coming from high-capacity mower-conditioners and windrowers. Current disk windrowers and mower-conditioners can cut about 14 ac/h. much less than most large harvesters and balers. Large forage harvesters often chop at twice that rate, so crop moisture could vary considerably from one end of the field to the other. If a few wet windrows delay baling until the next day and rain occurs overnight, the low capacity of the cutting system can be quite costly. Using two or more mower-conditioners or windrowers to get high-capacity adds to total harvesting cost through added labor and capitol costs.

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Tractor Based High-Capacity Mower					
Pros	Cons				
 Power unit fixed costs can be diluted over other operations Cutting widths to 32 ft are possible Costs per unit area generally less than dedicated mower 	 Power limits of row-crop tractors can limit cut width and/or cutting speed Cutting platform weight is limited by tractor axle and hitch weight limits Visibility of front-mount cutting platforms can be compromised Swath width limited by wheel spacing 				
Dedicated High-Capacity Mower					
 Power levels greater than row-crop tractors allow faster speed and cutting width Good weight distribution of units with midmount cutting platforms Swath width may not be limited by wheel spacing 	 Initial cost is greater per unit harvesting capacity Asset use denied for other uses, increasing fixed costs per unit area Visibility of mid-mount cutting platforms can be compromised 				

To achieve greater productivity, engineers can alter three factors: harvesting speed, cutting width and field efficiency. Potential limitations for these three parameters are listed in Table 1. The advent of cab and rear-axle suspensions will help ride quality, but safety will always be a concern at high field-speeds. Very wide cutting platforms with narrow conditioning rolls make drying difficult. Most high-capacity mowers use segmented cutterbars that reduce windrow density and more easily follow ground contours. However, many small windrows can create incompatibility with merging equipment. As cutting machines get wider, they lose field efficiency because of greater overlap loss. Technology is now widely available to reduce overlap loss to almost zero using "autosteer" systems.

There are now many different high-capacity mowers with cut widths up to 32 ft offered for sale in North America. These machines can be broadly categorized as tractor based units or dedicated self-propelled mowing machines. Table 2 lists pros and cons of either configuration. Some high-capacity mowers can merge crop at cutting but these machines have not been widely adopted because the advantages of wide-swath drying are lost when swaths are merged at cutting. Also, when crop yields are light, 32 ft of crop is not enough for large forage harvesters. As the market of high-capacity mowers increases, there will be a need for new, more cost effective merging systems that are compatible with the cutting width and number of swaths produced by the high-capacity mower.

High capacity machines tend to be more technically complicated and, therefore, may be less reliable than smaller, less technical machines. Reliability is very important because the economic impact of downtime grows as machine size and capacity increases. The need for reliability may, in fact limit machine size because some producers would rather have two smaller machines than one large machine. Although operating two machines may increase costs, the owners see value in the redundancy and scheduling flexibility that two machines provide.

Trade-in value of high-capacity mowers may be limited because only a limited number of producers can justify these large machines and the reliability of used, highly technical equipment is often not acceptable for these customers. This fact must be considered when conducting enterprise budgets and planning for custom harvesting charges. Purchasers of large, high-capacity mowers that will have high annual usage may have to do their initial cost analysis assuming that the machine will have virtually no re-sale value other than scrap at the end of its useful life.

High-capacity mowers are becoming more popular because they help producers achieve high-quality forage. These machines can improve drying rate when they allow drying in a wide swath. Compatibility with merging and harvesting equipment should be considered before purchasing a high-capacity mower. It is important to carefully consider total costs of ownership and operation before purchasing a high-capacity mower.