

Cane Positioning

by

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Mechanical pruning has become an increasing necessity for many Michigan Concord grape growers. Therefore, the MSU Viticultural program undertook a research program to develop tools that would assist growers with the mechanical pruning of Concord grapevines, which had been trained to Hudson River Umbrella (top wire cordon). The first device that was developed was a hedging unit consisting of a vertically-oriented sickle bar with dual action blades. At the base of this sickle bar, a hydraulic motor is mounted. It drives a series of counter-clockwise rotating fingers (rubber hoses) that gather canes trailing below the vine. They are brought out to the plane of the sickle bar so they can be pruned. Therefore, a single vertically-oriented sickle bar makes both a side cut and an undercut on vines.

It became apparent that this device, as well as others in the industry, was often incapable of achieving adequate pruning severity to Concord vines. The main area of difficulty was at the top of the trellis. Canes running along the top of the trellis were not reachable with the mechanical pruning equipment. Therefore, an additional procedure was developed to reorient those canes so that they become a better target for the hedging operation. The process of reorienting those canes prior to hedging has been called cane positioning.

Several years of development of cane positioning devices has resulted in a unit that has two rotating heads, each with eight metal tines (Fig. 1). Each of these heads has a cup-like configuration (Fig. 2). The head closest to the tractor rotates counter-clockwise while the head on the other side of the trellis rotates clockwise. Therefore, the action of the tines is to come down to the top wire cordon, sweep across the cordon and then move downward and back toward the operator. Gillison Variety Fabrication, Inc. began commercial fabrication of this unit in 2000 and several Michigan growers have already purchased cane positioning units. Whereas the strategy for using these two pieces of equipment has been described in another publication (SWMREC Report #19), there has been no printing of general operating instructions for the cane positioning unit. Therefore, the following discussion is intended to help growers become familiar with the general setup and operation of this cane positioning unit.



Fig. 1



Fig. 2

The goal of cane positioning is to build up enough energy in the spring-loaded tine as it passes by the top cordon so that as it flexes by the top cordon, it will move canes away from the top of the cordon. It is not necessary to move these canes down along the sides of the trellis but merely to move them enough so they become accessible targets for the hedging operation. Certainly growers will adjust their use of this cane positioner to their particular situation as they gain experience. It is suggested that initial efforts with this device be undertaken as follows:

A. Head Height - When traveling down the trellis row, the center of the rotating heads should be approximately at the height of the top wire of the trellis (Fig. 3) . Moving the heads lower into the trellis will make the unit more aggressive for reorienting canes on the side of the vine but it will tend to be less efficient at moving canes running along the top of the trellis.

B. Head Orientation - The cup-like heads should be oriented so that when a tine touches the top wire of the trellis, it is horizontal to the ground and perpendicular to the trellis wire (Fig. 3). When the heads are in that orientation, the motion of the tines as they move below the top wire of the trellis will be down and back towards the operator (Fig. 4).



Fig. 3



Fig. 4

C. Spacing Between Heads - Initial efforts with the cane positioning device should be undertaken so that the tines from the two heads just meet, but do not overlap (Fig. 5). Overlapping the tines will make the unit more aggressive but it will also risk additional damage to the vines as well as tine breakage. Orientation of the tines from the two heads so they just meet should be capable of moving a large percentage of the canes along the top of the trellis but not all of them. Those that are not successfully cane positioned and hedged will be the target of the hand follow-up pruning.



Fig. 5

D. Ground Speed - An initial ground speed of about 2 miles per hour is recommended. For a typical vineyard, this will allow the cane positioning of one acre of vineyard in approximately 30 minutes. Increasing the ground speed to 3 or 4 miles per hour would reduce the time required to cane position an acre of vineyard to 20 or 15 minutes, respectively. However, that 10 to 15 minutes per acre in time savings may actually be a false economy of labor because less efficient cane positioning and hedging, may require considerably more hand follow-up to complete the operation.

E. Head Rotation - Growers should initially operate the cane positioning device with a head rotation of approximately 20 rpms or 1 rotation every 3 seconds. The tendency when operating this cane positioning device is to rotate the heads much faster than this recommended rate. The result can be unnecessary damage to both the vine and the cane positioning unit. The combination of the forward speed of the tractor and the down and backward of the rotating heads should result in a net movement of the tine in a straight downward movement. Rotation of the heads too fast is likely to result in wrapping of canes

around those heads. If the ground speed of the tractor is too fast, there will be a tendency to push canes and the cordon of the vine forward along the trellis, thus increasing damage to the vine.

Although a ground speed of 2 mph may seem slow at first, this translates to a ground speed of approximately 3 feet per second. During one second, the rotation of the heads at 20 rpms will result in approximately 5 of the 16 tines striking the top wire cordon or approximately 7-inch intervals between sweeps of the cordon with the tines.

After a grower has gained experience with the cane positioner in this orientation, he will likely alter these specifications to meet the specific conditions of his vineyard.

The hedging and cane positioning units developed by the MSU Viticultural program are considered to be a part of but not a complete strategy for pruning Concord grapevines. Growers are urged to perform a manual cordon and trunk renewal step between cane positioning and hedging and to also perform a manual follow-up pruning after hedging to complete the pruning process.

Lastly, the mechanical pruning equipment described above should be operated with proper safety equipment to include protective eye wear.