The opportunity for burley producers to grow more tobacco after the buyout legislation and the increasing shortages of labor for harvesting and stripping has prompted a resurgence of interest in burley mechanization options. This article summarizes the status of equipment demonstrated or under development during the past season. Ongoing work will certainly offer additional developments and innovations in the coming seasons. Three commercial burley harvesters were demonstrated and a new experimental model was on display at a Philip Morris USA sponsored field day last September at the Roberts’ farm near Pleasureville, Ky. Several innovative stripping aids are under development and emerging from stripping rooms around the burley belt.

Automated Harvester

The former “Big Red” self-propelled automated harvester developed during the last decade by U. Ky. Agricultural Engineers is now being commercially manufactured as the “GCH Gold Standard” by GCH International of Louisville. The machine is capable of up to five acres per ‘normal’ day but could extend harvesting into the night time for additional production. Sturdy 8 x 14 ft. metal frames receive and support approximately 448 plants in the eight slotted rails of each frame. Approximately 15-16 frames are required per acre of harvested burley. Five empty frames are loaded onto the harvester at a time using an extended reach all-terrain forklift. A filled frame is set off the harvester on self-contained support legs. Later, the extended reach all-terrain forklift moves the filled frames to a sod area for covering with special poly tarps and curing. Two workers are required for the harvest.

The price for the harvester is quoted as $379,000 each, with assembled frames quoted at $12,120-$13,344 per acre. Thus, a system for large annual harvest acreage will be a major investment and will likely involve options for corporate financial support, leasing and/or custom harvest. Whether double curing with the metal frames can be achieved is under consideration and remains to be tested and proven as a viable option for multiple use of the frames during a season, thus reducing curing costs.

MarCo Harvester

A plant-notching harvester is being built by MarCo Manufacturing Co. LLC of Bennettsville, SC. It is a tractor-mounted 3-point hitch machine powered by a PTO driven hydraulic system that cuts, notches and conveys the plants via the traditional ‘sticker chain’ design onto a wagon pulled along side the machine. Transport and hanging details are described below. The current model 6026 machine is quoted at $27,500 from the factory.

Kirpy Harvester

A French manufacturer has developed a special tractor-mounted and hydraulically powered machine that was imported this past season. The “Kirpy” harvester uses a small “log chain” type conveyor with small spike-laden metal plates that convey plants from a standing position to deposit them horizontally onto a flat bed wagon pulled along side the harvester. A special requirement experienced by the trial users in the U.S. is that the tractor must have a very slow ‘creeper’ ground drive (0.6 to 1.0 mph) while running the PTO at near 540 rpm for proper hydraulic flow and pressure. The Kirpy machine is being marketed by a U.S. Distributor and was quoted as around $23,000 FOB from the distributor last fall with future prices likely affected by money exchange rates and shipping costs.

Both the MarCo and Kirpy harvesters can fill a farm wagon rather quickly with the loosely stacked plants, usually in 400-500 feet of row length. Multiple tractor and wagon units (probably 3 or more) are needed to shuttle wagons from the harvester to the wire type field curing framework to get maximum productivity of the harvester of approximately 2.0 to 2.5 acres or more per normal day.

High tensile wire field curing structure

The MarCo and Kirpy machines require a high tensile wire field structure for hanging the plants for curing. Strong construction is essential as several hurriedly built frameworks partially failed this past year after loading.

Several workers (possibly 8-10) are needed at the high tensile wire framework to unload the wagons to maintain continuous harvester operation. Thus, a total ‘crew’ of 11-13 workers to harvest 2.0 acres or more per day. An advantage of this method is that the workers are only handling one plant at a time rather than handling a heavy stick of plants. All structures should have some form of plastic cover to protect the tobacco from rain and wind during the cure.

The leaf breakage from piling the plants onto the wagon and removing them appears to be somewhat greater than normal manual harvest depending on the condition of the tobacco at harvest and worker care in removing tangled plants from the wagonload. Further studies are needed to determine the extent of leaf breakage and whether improvements can be made to reduce the breakage.
Prototype Rail Harvester

A new machine for harvesting burley is under development by the University of Kentucky Biosystems and Agricultural Engineering Department. The new experimental system is similar to the automated harvester’s functions but involves a tractor-drawn harvester that cuts, conveys, inverts and notches whole burley plants. Notched plants are inserted into slotted steel rails, 10 feet long, holding 40 plants each. Ten filled rails are unloaded on-the-go by the harvester onto the ground.

A tractor-drawn retriever/transporter picks up the ten-rail ‘loads’ and transports them to field curing structures. The rails are unloaded upon and supported by such structures with later covering for rain and wind protection. Preliminary estimates indicate an approximate harvesting capacity of 0.3 acres per hour for two workers. Potential machine and rail costs are unknown at this time.

Mechanical Stripping Aids

Two mechanical leaf-removing stripping machines are known to be under development but have not been publicly demonstrated at the time of this writing.

Several innovative mechanical stripping aids are emerging from past research and current producers. Stalk choppers and conveyors for removing stalks from the stripping area are also under development.

The use of the stripping wheel aid and several chain conveyor configurations are part of these mechanical stripping aids. These stripping aids enable the workers to remove leaves more rapidly with both hands while the plants are being conveyed past them. The opportunity for putting non-oriented leaf into the big bales has enabled these aids to become more efficient and productive. One or two workers pick up and insert plants into the conveyor devices, maybe removing the lower grade first, with the additional workers removing additional grades. Another worker removes, stacks and/or carries the stalks to a wagon or truck bed for periodic disposal. Or, the stalks are directed into a stalk chopper mechanism that chops and conveys the particles into a hopper wagon or similar transport and self unloading vehicle for field distribution or other uses.

Some of these mechanical stripping aids are being built for commercial sale. Videos of operation and some sources of equipment are shown on the BAE tobacco web site listed above. Data on performance and costs are being obtained and will be available later in 2007. Check the BAE web site for periodic updates.