E. O. Beasley

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PROGRESS REPORT

HORTICULTURAL CROPS MECHANIZATION

A prototype trellised tomato harvesting aid and sprayer was built and tested in 1971. The machine performed both the harvesting and spraying functions satisfactorily, and was credited with greatly reducing the amount of harvesting labor required as well as the strenuousness of the work by a grower who used it for most of the harvesting season. Much improved disease control was reported by both the grower and the county extension agent where this machine was used to spray, as contrasted with the grower's own sprayer. Modifications based on experience with the prototype were incorporated into a set of plans for the harvester-sprayer, which have been printed and made available to growers who wish to build their own or have one built locally. Several have done so in 1972 at a considerable savings to themselves. Additional uses for the small tractor powering the harvester are contemplated, such as fertilizing, cultivating, and tying vines, as well as some possible applications in other crops.

Demonstrations and evaluations in previous years of a commercial fresh-market cabbage harvester had indicated that it was functional and effective as an alternative to hand harvesting; however no "production runs" had been scheduled in this state. Such a test was conducted in Jackson County in 1971, with the addition of an "on-stream" packing arrangement to provide some insight into whether this or centralized packing is more practical. Approximately 600 crates of cabbage were harvested mechanically and sold through the grower's normal marketing outlet, and were readily accepted by that market (a major grocery chain). While the concept of "on-machine" packing was felt to be less practical than centralized packing, the workability of the mechanical harvester as a replacement for hand labor in cutting cabbage was fully demonstrated, and its potential as the basis on which a highly mechanized production, harvesting, packing, and shipping system for cabbage can be synthesized is apparent. Uniformity in head size and simultaneous maturation of all

heads to minimize culls resulting from once-over harvesting is still the greatest deterrent to mechanical cabbage harvesting in North Carolina.

Research and development work in this department on a multiple-pick mechanical cucumber harvester had progressed to such a point in 1971 that it was felt to be ready for commercialization. Discussions with a manufacturer led to his procuring a license and building two prototype harvesters to be used as pilot commercial models in 1972. Since the production techniques for multipick mechanical harvesting are radically different from current production practices, and since successful use of the harvester itself requires a higher degree of skill and management than currently prevails among cucumber growers, it was felt that a substantial Extension involvement would be needed to help growers make a successful transition from hand harvesting to mechanical harvesting. Toward this end, an active role was taken by Extension, in cooperation with research personnel, in the testing, evaluation, and modification of the pilot commercial cucumber harvester in 1972, with emphasis on acquisition of educational resource materials appropriate to the anticipated work ahead. It is expected that this educational task will begin in 1973 with the purchase of a limited number of harvesters by North Carolina growers, and will accelerate thereafter. The result will be a greatly decreased grower dependence on a dwindling, capricious, and expensive labor supply, and a maintenance of net profit at current levels.

Sharply increasing acreages of muscadine grapes in North Carolina have created pressure for assistance in all phases of the production of this crop. Disease and insect control is one facet of production which has proven to be crucial. While equipment is available to apply the chemicals needed for pest control, it is expensive; and its ownership can only be justified on rather substantial acreages. No equipment is commercially available which will do a satisfactory job, and which is inexpensive enough for growers of five acres or less of grapes. A plan for a tractor-

mounted grape sprayer was developed and made available, along with an extension folder to explain and emphasize some of the considerations in grape spraying. This sprayer is inexpensive and of limited capacity, suitable for growers of five acres or less. Since publication of the plan, interest has been expressed by at least one manufacturer in building this unit for sale.

A streamlined and modernized cotton production technique was implemented with a large cotton grower in Robeson County. This grower had prepared his soil and planted cotton in the conventional way, which involved many single-function trips over the field in both fall and spring for cutting stalks, disking, redisking, plowing, disking again to incorporate herbicides, and harrowing, etc. Much of this work had to be done in the spring, which caused a real bottleneck, particularly if bad weather interfered. To alleviate this situation and to take advantage of the improved seed and seedling environment provided by planting on beds, the grower under Extension leadership invested in rotary tillers and bed-forming equipment and made provision for attaching his planters to this equipment. His 900 acres of cotton land was rotary tilled and bedded in one operation in the fall and winter of 1971, much of it without shredding stalks or chiseling. At planting time in the spring, the rotary tiller was equipped with bed shapers and planters, and in one pass over the field herbicide was applied and incorporated on the beds, and the beds were precision shaped and planted. Cotton plant stands were good on all the 900 acres; plants emerged and grew off well on the warm, well drained beds (particularly impressive due to predominance of cool, wet weather this spring), and crop appearance is excellent as of midsummer. Considerable savings in land preparation costs were claimed by the grower, plus improved distribution of workload which permitted more timely planting, and no acreage had to be replanted as was generally the case in prior years. Similar techniques can presumably be adopted by many other growers to their advantage.

Reduced tillage tests on a cotton-corn-peanuts rotation were continued under Extension leadership for a second year at the Peanut Belt Research Station. Yields for the first year were equal to or better than conventional for some of the reduced tillage regimes on all these crops. Weed control was a problem in some cases; however improvements have been incorporated for the second year which it is hoped will solve weed control deficiencies.

Extension involvement in 4-H projects and activities was continued throughout the year at about previous levels. Accentuation of safety and health aspects of farming operations has become more obligatory, particularly with the passage and implementation of the federal Occupational Safety and Health Act of 1970. This act has very limited applications to agriculture at present, but will almost certainly be expanded to cover more agricultural operations in the near future.

COMMITTEES SERVED ON

1. School of Engineering Safety Committee
2. Departmental Safety Committee (Chairman)
3. Extension Commodity Coordinating Committee on Small Fruits
4. Extension Commodity Coordinating Committee on Vegetable Crops
5. Extension Long Range Planning Subcommittees on:
   (1) Fruits
   (2) Vegetables
   (3) Ornamentals
6. Christmas Tree Research Committee (Interdepartmental)
7. Research Task Force on Ornamentals, Nursery Crops, Greenhouses, and Turf
8. Nominating Committee, N. C. Section ASAE
9. Extension Committee to Coordinate Occupational Safety and Health Act of 1970
10. National Farm Safety Week Committee (Extension)
11. Action Committee, Eastern Regional 4-H Tractor Operator Contest
12. PM-48, ASAE Subcommittee on Mechanization of Fruits and Vegetables

PUBLICATIONS PREPARED

1. Extension Circular 475 (Revised) - Growing Trellised Tomatoes in Western North Carolina
2. Extension Folder 299 - Vertical Trellis Grape Sprayer
3. BAE Plan No. 2178 - Tractor Mounted Grape Sprayer
4. BAE Plan No. 2179 - Harvesting Aid and Sprayer for Trellised Tomatoes

ARTICLES PREPARED

1. "Take the Stoop Out of Cabbage Cutting", Progressive Farmer, October 1971