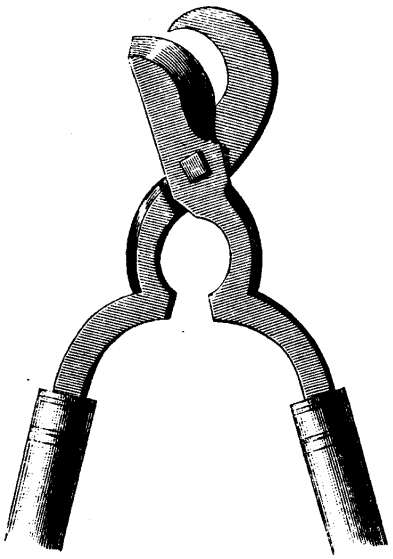
RUTGERS COOPERATIVE EXTENSION AT THE NEW JERSEY AGRICULTURAL EXPERIMENT STATION

PLANT & PEST ADVISORY

FRUIT EDITION $1.50 JANUARY 16, 2001



INSIDE

Apple Training and Pruning to Maximize Orchard Performance

Jeremy Compton, North Jersey Tree Fruit Technician and Win Cowgill, Area Fruit Agent

Orchard productivity and development are direct functions of sunlight. Sunlight management is the key to high annual yields and a profitable orchard. Annual pruning is a necessary practice that maintains the profitability of an orchard. Knowing not only what must be cut out but also what should be left in and how the tree will respond is the science behind pruning. The productivity of an orchard can be affected for the next three years by cuts made this season! It is critical for growers to know what will result from management decisions made now, and understand what technique will maximize profits in the long run.

The objective of tree training and pruning is to *maximize* sunlight interception by the orchard and allow the light to be distributed within the tree canopy in a manner that will maximize fruit quality this season and fruit bud initiation for next season's crop. Proper light interception and distribution is the key for growing high quality fruit. Correct pruning and tree manipulation techniques must be done on an annual basis. Growers should also keep in mind other important factors that justify the need for pruning, such as the maintenance of proper tree height, structure, and appropriate balance between vegetative growth and fruit. This allows for annual cropping of high quality fruit with better color and increased sugars. Penetration of spray materials and natural reduction of pest pressure are other factors that are directly related to pruning.

In most cases, we prefer to discuss pruning in a manner that stresses the complimentary process of tree manipulation (training) in the same text. Intensifying planting densities also dictates the need for pruning to be dependent on manipulation. But for the sake of length we will just discuss important rules of pruning as they apply to all orchard densities.

Although pruning is an overall dwarfing process, it is locally invigorating, stimulating vegetative growth at the site of the cut. On a non-bearing tree, this type of stimuli causes the tree to remain in the vegetative mode, which delays cropping. For this reason, pruning young non-bearing trees should be avoided unless correcting major structural defects. Tree training and minimal corrective pruning of

SEE PRUNING ON PAGE 2

PRUNING FROM PAGE 1

tree structure in the non-bearing years are critical to the overall performance of an orchard throughout its life. Branch manipulation (training) plays the major role on tree structure and precocity (how quickly the orchard bears a crop) in the non-bearing years of an orchard. Only minor pruning should be done until the tree bears a crop for a year. After the tree has produced a crop, then it is time to begin an annual pruning regiment. Since no major pruning is to be done prior to this time, the tree may need a lot of attention (depending on variety), but in a controlled manner over a period of years. An excessive amount of pruning at any single time will cause an overstimulation of vegetative growth and a loss of balance within the tree. Excessive pruning can also cause sunburn to the fruit and wood of sensitive varieties such as Gala and Golden Delicious.

Central Leader Importance

The central leader is the tree's natural regulator. Tree performance and structure depend heavily on the manipulation of the leader. Cutting into the central leader can cause a loss of control with that tree or delay cropping on non-bearing trees. Heading cuts on a central leader should be done at planting when conditions warrant its use, and should be the last option used to induce branching on established trees. If more branching is desired, other techniques such as notching, bending or the use of plant growth regulators may provide a better alternative for inducing branching on the leader. Never cut into the central leader without knowing what responses the tree will express.

Two types of pruning cuts: heading and renewal

A heading cut is when a cut is made into a branch or the leader, cutting back to a weaker shoot along that branch or leader. Heading cuts stimulate excessive growth at the site of the cut, and will stiffen the wood that has been headed. Juvenile (1 year old) wood will respond much more prolifically to such a cut as opposed to mature wood. Heading cuts should be avoided unless the intent is to cause one of these two responses to occur. Unnecessary heading cuts into an established limb or scaffolds juvenile wood will cause an excessive amount of flush growth that will shade out the tree and be counterproductive to good tree management techniques. If tree growth suppression and the maintenance of a compact tree are the only desired effects from a heading cut, always cut an established limb or scaffold back into a mature, bearing side shoot or limb. When making a heading cut *never* cut a limb back to blind wood (deadhead). The result will be tip dieback and wood rots will occur.

Renewal cuts, on the other hand, are cuts made at the point of branch origin. Most renewal cuts are intended to remove a branch that is no longer desirable because of vigor concerns or excessive crowding. Renewal cuts on established trees are always into mature wood and will not spark the vegetative regrowth that a heading cut will.

The Two to One Rule

Any scaffold or limb that is half the size or larger in diameter to the main leader should be removed. A branch of this size will choke out the leader, not allowing the tree to reach optimal fruiting capacity. By leaving a limb of such girth, the constriction problem compounds every year and eventually the limb will be larger and more dominant than the leader itself. The bending of such a limb to the horizontal will slow a limb's growth, but in an instance where the limb is already out of proportion to the main leader, growth will not cease completely, and the limb will continue to hinder the tree's growth and performance. In a crowded mature orchard, this technique can be used in a reverse manner. By leaving such a dominant scaffold in place, future tree growth will be retarded (as discussed above) and the limb will aid in controlling tree size.

Spur pruning is a good way to rejuvenate trees that are heavy spur bearers such as Red Delicious and Empire. A tree will produce its highest quality fruit on spurs that are 2-5 years old. Any spur that is older than 5 years yields reduced quality fruit. That spur is no longer efficient and should be removed. The age of a spur can be determined by its size.

The proper balance between fruit and vegetative growth is another important relationship. An imbalance between the two can result in inferior quality fruit and biannual bearing. No two systems or cultivars will respond in the same manner to the above presented techniques, but understanding these procedures, and the response they induce will help reduce the gamble of making an improper decision. Growers need to be conscious of details that relate specifically to their cultural systems, and proper ways of managing them.

There are many more techniques and tree responses that need to be understood when managing an orchard. Each orchard system provides new and unique techniques to the growing process. Sometimes, less is more, and understanding what can be manipulated is just as important as knowing what needs to be removed. An orchard's optimal performance will never be achieved if this relationship is not understood and maintained. ❑

FRUIT MEETING FROM PAGE 3

As in previous years, The New Jersey Peach Council will hold its annual business meeting as part of the program. This meeting will be held at the beginning of the afternoon session.

The trade show is expected to host 15-20 exhibitors and will be held in conjunction with the meeting.

Pesticide units in CORE and Categories will be provided. Pre-registration is mandatory and can be obtained by contacting Mr. David Schmitt at Rutgers Cooperative Extension of Gloucester County at 856-307-6450. Registration forms have already been mailed to many fruit growers. ❑

NJ 2000 PPV Surveillance Survey

A team comprised of stone fruit growers, regulatory officials from the New Jersey Department of Agriculture (NJDA) and Rutgers Cooperative Extension, held meetings to discuss survey guidelines established by the USDA, APHIS, PPQ and assign responsibility for the collection of these samples for the statewide national Plum Pox Virus (PPV) Survey.

Approximately 200 survey questionnaires were mailed out to stone fruit growers by the NJASS throughout the state in March and April asking for information concerning the sources, ages, variety and locations of their stone fruit orchards. The information gathered from these surveys was used in planning for the spring sampling season.

Initially, we received about 50% response from the survey questionnaires; after subsequent follow up contacts, we were able to increase the grower response rate to 70%. Another problem we encountered was getting enough manpower to conduct the field surveys. The sampling needed to begin while most students were still attending college, and we only had enough federal funding to hire personnel for about two months, limiting the number of interested candidates applying for the job. Additional funding will be needed next year to hire more applicants for the summer to collect samples and grower information.

Our top priority was to sample stone fruit nurseries, growers who were budwood sources, and growers who have received plant material from Adams County, PA within the last 10 years. New Jersey has about 9,000 acres of land dedicated to stone fruit production. Because most New Jersey growers have received stock from Adams County nurseries, we feel that the remaining orchards in the state also need to be surveyed in order to insure freedom from PPV. We expect to complete the rest of these surveys by 2002.

We began sampling using teams of two people, composed primarily of NJDA nursery staff, beginning May 10th and ending on July 19th. An additional round of sampling was conducted by staff from September 11th to the 29th.

Field crews made prior contact with the growers to confirm the locations of their stone fruit blocks and to make sure that the blocks were not recently sprayed. The pesticide reentry periods following grower spray operations was a significant handicap in collecting leaf samples during the spring collection period, but was not a concern during the fall collection period.

Once the teams collected the samples using the established sampling protocols (Gottwald hierarchal sample protocol), the leaves were immediately bagged, tagged and placed on ice. Daily drop-off points were used to collect the samples from the teams in the field. They were then shuttled to the NJDA plant laboratory for analysis using ELISA technology. An initial problem encountered by the laboratory was the ineffectiveness of the positive control issued with the ELISA test kit by. We lost one week's worth of foliar collections waiting for this issue to be resolved, all of which were re-sampled.

This year our staff collected and analyzed 10,793 leaf samples from 75 growers, representing 1,743 acres of stone fruit. These numbers represent the sampling of approximately 363 commercial blocks of stone fruit, one commercial fruit tree nursery and the Rutgers Experiment Station blocks. All samples collected and tested this year were negative.

We are currently locating growers who have not responded to our questionnaires and gathering information for use on next year's sampling season.

During our second year of collections, we are proposing to use teams of three people and punching out a representative sample of leaf tissue from the collected leaves in the field prior to bagging and submission for testing to the NJDA laboratory. By pre-punching the leaf tissue in the field we would minimize the amount of foliar tissue to be transported to the laboratory and allow faster processing of the material by the laboratory staff.

Submitted by Jerome L. Frecon, Agricultural Agent ❑

Cornell Emeritus to Speak at S. Jersey Fruit Meeting & Trade Show

The South Jersey Fruit Meeting and Trade Show will be held on Wednesday, February 21, 2001. Once again the meeting will take place at its traditional location: Masso's Crystal Manor in Glassboro, NJ

The Meeting is sponsored by Rutgers Cooperative Extension in conjunction with the New Jersey State Horticultural Society and will feature excellent presentations regarding state-of-the-art disease, insect and weed control, as well as nutrition management and general fruit culture.

The morning session will feature Cornell University Professor Emeritus, Warren Stiles, who will discuss "Orchard Nutrition Management". Dr. Stiles is one of the most respected and recognized names in the industry, and his research is well known. The afternoon session will feature special presentations devoted to the state-of-the-art in Integrated Pest Management. Rutgers specialists and fruit agents will discuss the latest research for disease management, establishment of insect suppressing groundcovers, mating disruption, and wildlife control.

See Fruit Meeting on page 2

Rutgers Cooperative Extension - NJAES
U.S. DEPARTMENT OF AGRICULTURE
Rutgers -The State University of New Jersey

Plant & Pest Advisory
18 College Farm Road
Cook College
New Brunswick, N.J. 08901-8551

Calendar of Events

January 30 - February 1, 2001 - 2001 Mid-Atlantic Fruit Convention in Hershey, PA. Contact Bill Tietjen, RCE of Warren County at 908-475-6505 or Jerry Frecon, RCE of Gloucester County at 856-307-6450.

February 21, 2001 - South Jersey Fruit Meeting and Trade Show, Masso's Crystal Manor, Glassboro, NJ. Contact Dave Schmitt at RCE of Gloucester County at 856-307-6450.

February 22 - 24, 2001 - The Mid-Atlantic Direct Marketing Association Annual Meeting at the Cavalier Hotel in Virginia Beach, VA., preceded by a Franklin/Covey Management Seminar, February 19 - 21. Contact Catherine T. Belcher, Virginia Department of Agriculture and Consumer Services, 1100 Bank Street, Room 1021, Richmond, VA 23219.

March 10, 2001 - A Viticultural and Enological Symposium. Forsgate Country Club, Jamesburg, NJ. Contact Dr. Joseph A. Fiola, Cream Ridge Research Center at 609-758-7311, X10, fax 609-758-7085 or e-mail: creamridge@aesop.rutgers.edu.

PLANT & PEST ADVISORY
FRUIT EDITION - CONTRIBUTORS

Rutgers Cooperative Extension Specialists
Robert Belding, Ph.D., Pomology
Joseph A. Fiola, Ph.D., Small Fruit & Viticulture
George Hamilton, Ph.D., Pest Management
Norman Lalancette, Ph.D., Plant Pathology
Bradley A. Majek, Ph.D., Weed Science
Peter Oudemans, Ph.D., Plant Pathology
Sridhar Polavarapu, Ph.D., Entomology
Peter W. Shearer, Ph.D., Entomology
Nicholi Vorsa, Ph.D., Breeding, Genetics and Culture
NJAES/Cook College
Joseph Goffreda, Ph.D., Breeding
Rutgers Cooperative Extension Agricultural Agents and Program Associates
Atlantic County, Gary C. Pavlis, Ph.D. (609-625-0056)
Gloucester County, Jerome L. Frecon (856-307-6450)
Hunterdon County, Winfred P. Cowgill, Jr. (908-788-1338)
Morris County, Peter J. Nitzsche (973-285-8300)
Warren County, William H. Tietjen (908-475-6505)
Fruit IPM, Dean Polk (609-758-7311)
Meredith Peters, Program Associate (908-788-1338)
Gene Rizio, Program Associate (856-566-2900)
David Schmitt, Program Associate (856-307-6450)
Newsletter Production
Jack Rabin, Assistant Director, NJAES
Cindy Rovins, Editor and Designer
Mary Ann Hughes, Assitant Editor