



# New Jersey Peach Crop Profile

## Production Facts

- New Jersey ranks 2<sup>nd</sup>-5<sup>th</sup> in the U.S. in the production of peaches, producing 3.9-7.7% of the total U.S. crop (6, 7).
- New Jersey ranks 2<sup>nd</sup>-3<sup>rd</sup> in value of production because of fresh market sales (3, 7).
- 78.0 million pounds of peaches valued in excess of \$ 33.7 million were produced during the 1996 crop year on 8,800 acres (4, 7).
- 65.0 million pounds of peaches valued in excess of \$ 29.2 million were produced during the 1997 crop year on 8,378 acres (7).
- 70.0 million pounds of peaches valued in excess of \$ 30.5 million were produced during the 1998 crop year on 8,000 acres (7).
- 100% of the crop is sold to the fresh market.
- Peach-bearing acreage has decreased from 10,800 in 1994 to 8,000 in 1998 (6).
- It costs approximately \$ 3,129 per acre to produce peaches in NJ (1).

## Production Regions

The Southern district (Gloucester, Cumberland, Camden, and Atlantic counties) is the major growing region in New Jersey where 88.3% of the state's production is concentrated. Gloucester county is the main growing area where 42.3% of New Jersey's peach production is located, followed by Cumberland county (22.4%), Camden county (14.1%), and Atlantic county (9.5%) of the New Jersey peach production respectively. The Central district (Burlington, Monmouth, Middlesex, and Mercer counties) represents 6.8% of the total production. The Northern District (Bergen, Hunterdon, Morris, Sussex, and Warren counties) produces 2.3% of the crop, while the remaining counties produce 2.6% of New Jersey's peach crop (4).

## Cultural Practices

- Medium textured friable, well-drained soils that are deep with no hard pan and high in organic matter are the best soils for growing fruit trees. Good subsoil aeration and drainage are essential for good growth, production, and longevity of peach trees.
- Growers in New Jersey establish and maintain permanent sod or keep bare soil in the drive rows by disking and herbicide applying. When necessary, they mow sod and weeds, and apply herbicides to reduce noxious weeds. Tree row is maintained as bare soil by herbicide sprays.
- Annual fertilization is a common practice to insure optimum growth and production of peach trees. Fertilizers include all major nutrients, but especially nitrogen.
- Tree pruning is performed annually and usually is conducted during late winter until sometime after bloom. It is performed for various horticultural reasons and to remove dead wood and winter killed buds, as well as disease infected tissue.
- Manual fruit thinning to maximize fruit size is a required practice during most crop years.

## Insect and Mite Pests (2, 5)

### European Red Mite (ERM) - *Panonychus ulmi* (Koch) (ACARI: Tetranychidae)

ERM overwinters in the egg stage on twigs and in bark cracks and crevices. Overwintering eggs hatch in the spring and larvae immediately move to young foliage and commence feeding. ERM can build up to the point where leaf bronzing is visible by mid- to late July. If leaf damage is both heavy and early enough (second to fourth covers) leaves can drop prematurely, tree susceptibility to winter injury increases and next year's crop can be affected.

### Chemical Control

In recent years, a number of orchards were found to have strains of mites with various degrees of resistance to Kelthane, Carzol, and Vendex. Because of this problem, Superior oil applications in dormant and delayed dormant, and pre-bloom control with either oil or Apollo becomes even more important. Petal-fall miticide sprays can help season-long mite control. No thresholds exist for this pest.

- **Superiol oil** - 6 gal/acre in Dormant or 4 gal/acre in delayed Dormant; 200 gal spray/acre gives the best results; Supracide or Lorsban in combination with oil enhances control.
- **Supracide 25WP** - 4-6 lbs/acre in Dormant or delayed Dormant.

- **Lorsban 4EC** - 2-4 pt/acre in Dormant or delayed Dormant.
- **Apollo 50SC** - 2-8 oz/acre when needed; < 4 oz/acre can be applied in IPM programs if predator mites are present.
- **Vendex 50WP** - 1-2 lbs/acre when needed.
- **Carzol SP** - 1-1.25 lb/acre when needed.

### **Two Spotted Spider Mite (TSM) – *Tetranychus urticae* Koch (ACARI: Tetranychidae)**

This mite overwinters as an adult on perennial plants (weeds) and orchard trees. Dormant oil sprays are not effective for controlling this species, however, most other miticides are satisfactory. In spring, two-spots serve as food for the predator mite, *Amblyseius fallacis* and *Stethorus punctum*.

#### Chemical Control

All below listed materials applied when needed against ERM effectively control TSM.

- **Apollo 50SC** - 2-8 oz/acre.
- **Vendex 50WP** - 1-2 lbs/acre.
- **Carzol SP** - 1-1.25 lb/acre.

### **Peach Silver Mite (PSM) - *Aculus cornulus* (Banks) (ACARI: Eriophyidae)**

This mite feeds on leaf surfaces causing a silvery appearance. In orchards where sulfur is used, they are usually not a problem. This mite is unlikely to cause injury.

#### Chemical Control

- **Thiodan 50WP** - 2-4 lbs/acre and **Vendex 50WP** - 1-2 lbs/acre are labeled for control of PSM when needed.

### **San Jose Scale (SJS) - *Quadraspidiotus perniciosus* (Comstock) (HOMOPTERA: Diaspididae)**

SJS overwinters as nymphs under waxy coverings. It has three generations a year. Adults and larvae feed on trunks, limbs, twigs, and fruits. Fruit obtain characteristic red spot where insects settle and feed. High populations may affect tree vigor, growth and productivity, and kill fruiting branches and main limbs. SJS damage levels can exceed 17%.

## Chemical Control

SJS seems to be more troublesome every year and difficult to control once the immature stages (crawlers) and, particularly adult scales, are noted on twigs and limbs during the growing season. A dormant application of **Superior oil** - 6 gal/acre or 4 gal/acre in Delayed Dormant still is the best way to control this pest and is recommended in problem blocks. Best results are obtained when oil is applied in at least 200 gallons of spray per mature acre. An organophosphorous spray added to oil aids in control. **Supracide 25WP** - 4-6 lbs/acre or **Lorsban 4EC** - 2-4 pt/acre in Dormant or Delayed Dormant are also recommended. For postbloom scale control, **Guthion 50 WP** - 1 lb/acre and **Imidan 70WP** - 1.5 lb/acre are labeled and are only effective against the crawler stage.

## **Oriental Fruit Moth (OFM) - *Grapholita molesta* (Busck) (LEPIDOPTERA: Tortricidae)**

OFM attacks both stone and pome fruit. There are normally four generations of this insect each year but a fifth generation may occur in the southern two-thirds of the state during a warm year. First generation larvae bore into succulent twigs usually about the time when shucks split. Later generations attack developing fruit, often boring into the fruit as tiny larvae, close to the stem. First brood larval control is timed to degree-day accumulations and usually commences about the time shucks split. In bad years, up to 16% of fruit can be damaged by OFM.

## Chemical Control

- **Guthion 50WP** - 1 lb/acre when needed.
- **Imidan 70WP** - 1.5-2 lbs/acre when needed.
- **Sevin 50WP** - 4 lbs/acre when needed.
- **Sevin 80WP** - 1-2 lbs/acre when needed.
- **Sevin XLR** – 2 qt/acre when needed.
- **Lannate 90SP** - 0.5-2 lbs/acre when needed.

Mating disruption of OFM was implemented in four commercially managed orchards in Cumberland County in 1999. It provided over four months non-insecticidal control that reflected to total reduction of organophosphorus and carbamate insecticides in average 4.7 lbs Ai/A when compared with conventionally managed orchards. The decreased number of insecticide sprays allowed beneficial arthropods to build up to levels almost twice that observed in conventionally managed orchards.

**Plum Curculio (PC) - *Conotrachelus nenuphar* (Herbst) (COLEOPTERA: Curculionidae)**

Generally, overwintering adults (weevils) make their first appearance in orchards during peach bloom. Cool weather slows down their emergence from overwintering sites while warm spells (70°F and above) can cause large numbers of weevils to suddenly appear in trees. There is one generation per year in Northern New Jersey and two in the South. PC damage fruit can exceed 8%.

**Chemical Control**

The petal fall, shuck split, shuck fall, first and second cover sprays are most critical for control. Most effective insecticides labeled for plum curculio control are:

- **Guthion 50WP** - 1 lb/acre or **Imidan 70WP** - 1.5 lb/acre applied when needed.

**Green Peach Aphid (GPA) - *Myzus persicae* (Sulzer) (HOMOPTERA: Aphididae)**

It is a common pest of peach and nectarine throughout New Jersey. Large numbers of aphids suck the plant juice from the leaves causing them to become stunted, curled, and discolored (yellow) by June. High numbers affect fruit quality. Aphids normally disperse to other host plants by mid-June. Up to 25 % damage to peaches can be exceeded in bad years.

**Chemical Control**

For best results, **Thiodan 50WP** - 2-4 lbs/acre, **Lannate 90SP** - 0.5-2 lbs/acre or **Lannate LV** - 3-6 pt/acre should be applied dilute at pink bud and again at petal fall. **Lannate** will provide fair control of oriental fruit moth and catfacing insects. Make applications before leaves become curled and discolored.

**Black Peach Aphid (BPA) - *Brachycaudus persicae* (Passerini) (HOMOPTERA: Aphididae).**

Unlike other aphids, BPA feeds below ground on peach roots and large populations can severely debilitate young trees. In spring, many of these overwintering root feeders emerge to establish colonies on the buds. Their color is dark brown to black and when full grown, is nearly 1/10 inch long. Populations can increase rapidly as the winged forms spread the infestation throughout the orchard. In midsummer, aphids migrate downward through soil cracks to peach roots where they spend the winter. Once aphids become established on the roots, control is difficult.

## Chemical control

Control on twigs and leaves is best achieved when **Thiodan 50WP** - 2-4 lbs/acre, **Lannate 90SP** - 0.5-2 lbs/acre or **Lannate LV** - 3-6 pt/acre is applied early in the season before leaves become deformed (Bloom (Stages 7-8) and Shuck-Split).

The most effective control of the black peach aphid is to prevent its introduction into the orchard on the roots of nursery stock. This is easily accomplished by dipping the roots of young trees in a **Thiodan** solution. To prepare dip, mix 1 pound of **Thiodan 50WP** with every 10 gallons of water. Dip trees to a point several inches above the bud scar and allow them to dry. Dip trees several days before planting.

**Catfacing Insects: Tarnished Plant Bug (TPB) - *Lygus lineolaris* (Palisot de Beauvois) (HETEROPTERA: Miridae); Dusky Stink Bug (DSB) - *Euschistus tristigmus* (Say) (HETEROPTERA: Pentatomidae); Green Stink Bug (GSB) - *Acrosternum hilare* (Say) (HETEROPTERA: Pentatomidae); Brown Stink Bug (BSB) - *Euschistus servus* (Say) (HETEROPTERA: Pentatomidae)**

The TPB, DSB, GSB, and BSB collectively form the group called catfacing insects. Their feeding on peaches during the pink and petalfall through shuck split periods generally results in dimpled, fuzz-free areas and/or aborted fruit. Feeding during the shuck fall to second and third covers results in unsightly, slightly sunken, callused, black blemishes on the skin surface generally 1/16 to 1/4 inch in diameter. These insects overwinter as adults and move into peach orchards about the time buds begin to swell. Because these bugs are strong fliers, their presence may be widespread, and depending upon availability of other host plants, injury can vary considerably from block to block. Other hosts include vetch, alfalfa, clover, goldenrod, fleabane, dog fennel, pigweed, ragweed, lambsquarter, and dozens of different kinds of flowers and commercial vegetables. Up to 34% of fruit can be damaged by these insects.

## Chemical control

Where catfacing has been a problem, insecticide applications are essential at PF and shuck split. Additional bug controls are needed during the shuck split to shuck fall period through third covers, depending upon the extent of the bug populations. Early season orchard cultivation is risky because it forces the bugs up into the trees. Eliminating alternate weed hosts in the orchard should reduce damage caused by this pest complex. Insecticides for controlling catfacing insects include:

- **Asana XL.66EC** - 4.8-8 oz/acre in Pink-Bud.
- **Ambush 2EC** - 7-12 oz/acre in Pink-Bud.
- **Pounce 3.2EC** - 4-8 oz/acre in Pink-Bud.
- **Carzol 92SP** - 8 oz/acre in Pink-Bud or 8-12 oz/acre when needed.
- **Guthion 50WP** - 1 lb/acre when needed.
- **Thiodan 50WP** - 2 lbs/acre in Pink-Bud and when needed, or 2-4 lbs/acre in 100% Petal-Fall.
- **Imidan 70WP** - 1.5 lb/acre when needed.
- **Lannate 90SP** - 0.5-2 lbs/acre when needed.
- **Lannate LV** - 3-6 pt/acre when needed.

In 1999 we monitored catfacing insects number and harmfulness to peaches in both orchards with good ground cover management (established sod) and typical, conventionally managed orchards. We found 42% fewer catfacing insects and 50% less catfacing damage to peaches in orchards with established sod in comparison with weedy and conventionally managed orchards.

**Flower Thrips (FT) and Western Flower Thrips (WFT) - *Frankliniella occidentalis* (Pergande) (THYSANOPTERA: Thripidae)**

On nectarine and peach, early season feeding damage can result in russeted fruit while late season damage takes on a silvering appearance. Cold, wet springs are not favorable for this pest because it delays development and heavy rains can actually kill these frail insects. Mowing ground cover during bloom and harvest should be avoided to prevent thrips from leaving the ground cover for the fruit. Also, eliminating flowering weeds in the orchard should prevent thrips populations from increasing and subsequent movement to the crop. Early thrips damage levels on fruit can exceed 26% while silvering caused by late thrips can be up to 80%.

**Chemical Control**

- **Carzol 92SP** - 0.5-1 lb/acre or **Lannate 90SP** - 1-2 lbs/acre when needed

**Japanese Beetle (JB) - *Popillia japonica* Newman (COLEOPTERA: Scarabaeidae)**

Larvae feed on roots of grass, herbaceous plants, and nursery stock, while adults feed on foliage and fruits. Fruit feeding is most common injury to stone fruits, particularly to varieties ripening during the JB flight period. For example “Redhaven”, “Norman”, “Glohaven”, and “Loring” are subject to attack by JB. It can cause up to 21% damage to peaches.

## Chemical Control

For best control, **Guthion 50WP** - 1 lb/acre, **Imidan 70WP** - 1.5 lb/acre, **Sevin 50WP** - 4 lbs/acre, **Sevin 80WP** - 2.5 lbs/acre or **Sevin XLR** - 2 qt/acre applied when needed.

## **Tufted Apple Bud Moth (TABM) - *Platynota idaeusalis* (Walker) (LEPIDOPTERA: Tortricidae)**

There are two generations per year. Adults generally begin flying and laying eggs from about mid-June to mid-July and from about mid-August through mid-September. In recent years, most damage has come from the second generation of moths because either spraying has stopped, fruit is tightly clustered, insufficient spray volume was used, or because of resistance development. Damage appears as a “shotgun” type of scarring on the upper and side surfaces of the fruit. TABM can also bore into ripening peaches. Heavier crops are most likely to sustain damage. TABM is mainly a problem in the Southern and Central counties where damage can exceed 21% in bad years.

## Chemical Control

For best results, increase spray volume per acre and thin to eliminate fruit from touching each. **Lannate 90SP** - 0.5-0.75 lb/acre or **Lannate LV** in combination with the below listed insecticides (all at reduced rates) gives the best control.

- **Lannate 90SP** - 0.5-0.75 lb/acre.
- **Lannate LV** - 1.5-2 pt/acre plus **Guthion 50WP** - 0.5 lb/acre.
- **Lannate LV** - 1.5-2 pt/acre plus **Imidan 70WP** - 0.75 lb/acre.
- **Lannate LV** - 1.5-2 pt/acre plus **Sevin 50WP** - 2 lbs/acre.
- **Lannate LV** - 1.5-2 pt/acre plus **Sevin 80WP** - 1.75 lb/acre.
- **Lannate LV** - 1.5-2 pt/acre plus **Sevin XLR** - 1 qt/acre.
- **Asana XL** - 4.8-10 oz/acre.

The ***B.t.***’s have also provided excellent control in New Jersey with repeated applications at high volume.

**Lesser Peach Tree Borer (LPTB) - *Synanthedon pictipes* (Grote & Robinson) (LEPIDOPTERA: Sesiidae)**

Peach and nectarine are the preferred hosts of LPTB. This borer attacks weak and injured trees, particularly those with Cytospora canker, winter-damaged orchards, and diseased trees. Adult borers (moths) are attracted to injured trees and deposit eggs in wounds from May through early July and again in September. Insecticide protection is recommended primarily for the control of the second brood in early September, and slightly later in northern counties.

**Chemical Control**

Applications should be made with a handgun to the point of run off, making sure to cover all cankers. **Lorsban 4E** - 1.5-3 qt/acre, **Asana XL** - 5.8 oz/acre or **Thiodan 3EC** - 1 qt/acre should be applied post-harvest with a handgun.

**Peach Tree Borer (PTB) - *Synanthedon exitiosa* (Say) (LEPIDOPTERA: Sesiidae)**

It is generally not as important as LPTB in the New Jersey peach orchards but localized severe infestations have occurred. Unlike LPTB, PTB can become established in healthy trees and can cause death of young trees in a single season. PTB usually flies from mid-June and most of the larvae are present in the trees by early September.

**Chemical Control**

Control can be achieved by drenching the tree trunk and scaffold limbs with **Thiodan 50WP** at 1.5 pounds per 100-gallon rate, **Lorsban 4E** at the 1.5 quarts per 100-gallon rate, or **Asana XL** at 4 oz per 100-gallon rate after harvest. Trees should be treated for peach tree borers the same time that the scaffold limbs are treated for lesser peach tree borers. The fumigating action of the insecticide, along with its residual action, should give good kill for those larvae already in the tree, if applied by early to mid-September. The residual action should also provide control for those young larvae still hatching from eggs. For best results, apply 0.5 to 1 gallon of spray to each trunk, preferably with a handgun. Airblast sprayers are not suited for borer control because not enough spray reaches the target area. Protect young trees before planting with a **Thiodan** root dip. To prepare dip, mix 1 pound of **Thiodan 50WP** with every 10 gallons of water. This solution must be agitated to prevent

settling out of the wettable powder. **Lorsban 4E** may be used as a pre-planting root dip at the equivalent rate of 3 qt/100 gallons of water. Dip trees to a point several inches above the bud scar and allow them to dry. Dip trees several days before planting.

## **Weeds (2, 5)**

Weeds are serious problem in orchard. They compete with fruit trees for light, water, nutrient, space, and serve as alternate hosts for harmful insects, diseases, and nematodes, and as well as provide cover for undesirable animals. Weeds can affect crop quality, reduce yield, and impede harvest.

When planning a control program, summer annuals, winter annuals and biennials, and perennial weeds should be considered separately.

**Canada Thistle - *Cirsium arvense* (L.)** - A perennial weed with vertical roots for food storage and horizontal roots that spread the weed vegetatively. Shoots emerge from this extensive root system in the spring. Flowers appear in late June, and seed is dispersed in July. The shoots die after the seed is dispersed. New shoots appear in late summer and grow vegetatively until frost. These fall shoots make food for the roots and do not flower.

### Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 3 lbs Ai/A (3 qt/A) broadcast application and/or 2-5% (2-5 gal of Roundup Ultra 4SC/100 gal water) spot spray in late June when the weed has flower buds or flowers, or in the fall after the shoots are 6 to 8 inches tall, but before frost.

For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 3 lbs Ai/A (4 pt/A) broadcast application and/or 2% (2 gal Touchdown 6SC/100 gal water) spot spray in late June when the weed has flower buds or flowers, or in the fall after the shoots are 6 to 8 inches tall, but before frost. For newly planted (nonbearing) and established (nonbearing) peaches.

**Camphorweed - (*Heterotheca subaxillaris* (Lam) Britt. & Rusby)** - A biennial in the southern states. Seeds germinate in the late summer or fall, and the plant overwinters as a rosette. Flowers are produced the following summer, and the plant dies. Whether camphorweed seedlings overwinter in New Jersey or originate from seed that germinates in the spring is unknown.

## Chemical Control

**2,4-D** - 1 lb Ai/A (1 qt/A) applied in the early spring after seeds have germinated, but before the plants begin to bolt for nonbearing established tree fruit crops only.

**Roundup Ultra 4SC (glyphosate)** - 1-2 lbs Ai/A (1-2 qt/A) broadcast application when the weed is growing rapidly and/or spot treatment 1% solution (1 gal /100 gal spray solution) when the weed is growing rapidly. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 1-2 lbs Ai/A (1.33-2.66 pt/A) broadcast application and/or spot treatment 1-2% solution (1-2 gal/100 gal water) when the weed is growing rapidly. For newly planted (nonbearing) and established (nonbearing) tree fruit crops only.

**Dandelion - *Taraxacum officinale* Weber** - A perennial plant grows actively during the spring and fall. Flowering in the spring coincides with many fruit trees and may interfere with pollination by attracting bees away from the trees. This weed is known to be an alternate host for the stem-pitting virus of peaches and other stone fruits.

## Chemical Control

**2,4-D** - 1 lb Ai/A (Use 1 qt/A Weedar 64 or OLF) applied in the fall after harvest or in early spring after the weed is growing actively but before flowers appear. Spray the vegetation-free zone under the fruit trees and the sod between the tree rows. For established (bearing) peaches.

**Roundup Ultra 4SC (glyphosate)** - 4-5 lbs Ai/A (4-5 qt/A) broadcast application and/or 2% (2 gal /100 gal water) spot treatment when the weed is growing actively and has flower buds. Spring or fall applications may be more effective than applications made in midsummer. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 3 lbs Ai/A (4 pt/A) broadcast application and/or 2% (2 gal /100 gal water) spot application when the weed is growing rapidly and has flower buds. Spring or fall applications may be more effective than applications made in mid summer. For newly planted (nonbearing) and established (nonbearing) tree fruit crops only.

**Goldenrod Species - *Solidago canadensis* L., *Solidago* ssp.** - Close related perennial weeds growing in April from rosettes or rootstocks. Typically, yellow blooms appear in late summer and the stems die in the fall. Some regrowth, as short stems or rosettes, often occurs before winter. Strong root systems overwinter and resume growth in the spring. The weeds spread using underground horizontal roots. Once established, control of this weed is difficult, since it is tolerant to most herbicides and the roots can be spread by cultivation or other tillage practices.

#### Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 2-4 lbs Ai/A (2-4 qt/A) broadcast application and/or spot treatment 2% (2 gal /100 gal spray solution) in May or June after spring growth is 8 to 10 inches tall, but before the shoots become too tall for good coverage with the spray solution. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 2-4 lbs Ai/A (2-4 qt/A) broadcast application and/or spot treatment 2% (2 gal/100 gal water) in May or June after spring growth is 8 to 10 inches tall, but before the shoots become too tall for good coverage with the spray solution. For newly planted (nonbearing) and established (nonbearing) peaches.

**Horseweed (Marestail) - *Conyza canadensis* (L.)** A biennial plant with seed that germinates in late summer or early fall. The seedling grows as a rosette during the fall and early spring. The plant bolts during the summer, flowers, sets seed, and dies during its second late summer and fall season. The common name “marestail” is a misnomer. Herbicide labels that claim “marestail control” may be referring to another weed.

#### Chemical Control

**2,4-D** - 1 lb Ai/A (1 qt/A Weedar 64 or OLF) applied in the fall after harvest or in early spring to control the weed in the rosette stage of growth. It is less effective after the weed bolts. For established (bearing) peaches.

**Roundup Ultra 4SC (glyphosate)** - 1-2 lbs Ai/A (1-2 qt/A) broadcast spray and/or 1% (1 gal /100 gal water) spot treatment when the weed is growing actively. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 1-2 lbs Ai/A (1.33-2.66 pt/A) broadcast spray and/or 1-2% (1-2 gal /100 gal water) spot treatment when the weed is growing actively. For newly planted (nonbearing) and established (nonbearing) peaches.

**Poison Ivy - *Toxicodendron radicans* (L.)** - A woody perennial vine or shrub with capability to climb fruit trees. Contact with any part of the plant may result in an itching, blistering skin rash. Nonselective postemergence herbicides must be used to control this weed. Initiate control measures before vine grows up the tree trunk.

#### Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 4-5 lbs Ai/A (4-5 qt/A) broadcast spray and/or 2-5% (2-5 gal /100 gal spray solution) spot treatment in mid-to late summer after the weed flowers in late June or early July or in early fall before fall colors appear. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 4 lbs Ai/A (5.33 pt/A) broadcast spray and/or 2% solution (2 gal / 100 gal water) spot applicator in mid to late summer after the weed flowers or in early fall before fall colors appear. Results of the fall application may not become evident until the following spring. Best results have been obtained in late summer after the fruit have formed. For newly planted (nonbearing) and established (nonbearing) peaches.

**2,4-D** - 1 lb Ai/A (1 qt/A Weedar 64 or OLF). Applied in the fall after harvest but before fall colors appear. One application may provide suppression only. A second application 2 weeks after the first application will improve control. For established peaches.

**Quackgrass - *Elytrigia repens* (L.)** - This perennial plant grows actively in the late spring and early fall when daily high temperatures range between 65° and 80°F (18.3° and 26.7°C). High midsummer temperatures, above 85°F (29.4°C) and/or low soil moisture, cause the weed to become dormant or semi-dormant until moisture and cooler weather return. The weed reproduces by seed and vegetatively by rhizomes, horizontal underground stems that eventually curve upward and make new shoots. The seedhead, which appears in June, resembles ryegrass, except each floret is rotated one quarter turn compared to ryegrass. The rhizomes are about one-eighth inch in diameter and may grow horizontally for up to several feet in length before curving upward and making a new shoot. Ryegrass does not have rhizomes.

## Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 2 lbs Ai/A (2 qt/A) broadcast spray and/or 1-2% solution (1-2 gal of Roundup Ultra 4SC/100 gal spray solution) spot treatment in late spring, May or June, or in the fall, October or November, when the weed has vigorous healthy foliage, a minimum of 4 to 6 leaves, and has begun to tiller. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 2 lbs Ai/A (2.66 pt/A) broadcast application and/or 1-2% (1-2 gal Touchdown 6SC/100 gal water) spot treatment in late spring, May or June, or in the fall, October or November when the weed has vigorous healthy foliage, a minimum of 4 to 6 leaves, and has begun to tiller. For newly planted (nonbearing) and established (nonbearing) peaches.

**Kerb (pronamide)** - 2-4 lbs Ai/A (4-8 lbs/A Kerb 50WP) in November when soil temperatures are between 35° and 55°F (1.67° and 12.8°C). Primarily controls perennial grasses, including quackgrass, bluegrass, ryegrass sp., fescue sp., and also provides early control of annual grasses the following spring.

Apply **Surflan**, **Prowl**, **Solicam**, or **Sinbar** the following May or June for full season annual grass control. Tank-mix **Kerb** with **2,4-D** and **Princep** for postemergence and residual broadleaf weed control. For established (bearing) peaches.

**Virginia Creeper - Parthenocissus quinquefolia (L.)** - A woody perennial vine with capability to climb and smother fruit trees. Nonselective postemergence herbicides must be used to suppress or control this weed. Remove the vine from the tree during winter pruning and lay it on the ground. Do NOT “prune out” the vine. Maximum leaf area is needed for herbicide application during the summer.

## Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 4-5 lbs Ai/A (4-5 qt/A) broadcast spray and/or 2 - 5% (2-5 gal of Roundup Ultra 4SC/100 gal spray solution) spot treatment in mid-to-late summer after vine flowers in early July, but before fall colors appear. Applications in spring or early summer, before flowering, have been less effective. Repeat applications may be needed. One application may merely suppress Virginia Creeper. For newly planted (nonbearing) and established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 4 lbs Ai/A (5.33 pt/A) broadcast treatment and/or 2% (2 gal Touchdown 6SC/100 gal water) spot spray in mid to late summer after the vine flowers in early July or in early fall before fall colors appear. Applications before flowering have been less effective. Repeat applications may be needed. One application may merely suppress Virginia creeper.

For newly planted (nonbearing) and established (nonbearing) peaches.

**2,4-D** - 1 lb Ai/A (1 qt/A Weedar 64) applied in July to weed foliage. Do not spray fruit tree foliage or green bark. Will provide suppression only. May be tank-mixed with residual herbicides. Do NOT tank-mix with **Paraquat/Gramoxone** or control may be reduced. For established (bearing) peaches.

**White Heath Aster - Aster pilosus Willd** - A perennial weed that begins growing in April from rosettes or rootstocks. Typically, blooms are about inch in diameter. The flowers have white or slightly tinted purple petals with yellow centers. They appear in late summer, set seed, and the stems die in the fall. Some regrowth, as short stems or rosettes, often occurs before winter. The weed spreads using underground horizontal roots. Once established, control of this weed is difficult since it is tolerant to most herbicides and the roots can be spread by cultivation or other tillage practices.

#### Chemical Control

**Roundup Ultra 4SC (glyphosate)** - 2-4 lbs Ai/A (2-4 qt/A) broadcast treatment and/or 2% (2 gal Roundup Ultra 4SC/100 gal spray solution) spot spray in May or June after spring growth is at least 8 to 10 inches tall, but before the shoots become too tall for good coverage with the spray solution. Generally, broadcast sprays must be applied in May, while spot treatments and ropewick applications can be delayed until June. For newly planted (nonbearing) established (bearing) peaches.

**Touchdown 6SC (sulfosate)** - 2-4 lbs Ai/A (2.66-5.33 pt/A) broadcast spray and/or 2% (2 gal Touchdown 6SC/100 gal water) spot treatment in May or June after spring growth is 8 to 10 inches tall but before the shoots become too tall for good coverage with the spray solution. Generally, broadcast sprays must be applied in May while spot treatments can be delayed until June.

For newly planted (nonbearing) and established (nonbearing) peaches.

## Cultural Control of Weeds

Plowing, disking, and harrowing before planting an orchard and disking, mowing, and hand-weeding after trees are planted helps eliminate perennial and broad leaf weeds.

## Diseases (2, 5)

**Bacterial Spot** is caused by the plant pathogenic bacterium *Xanthomonas campestris* pv. *pruni*. Bacterial spot infections occur anytime from petal fall until after harvest. This bacterium can attack leaves, twigs, and fruit. Foliar infection results in angular, grayish lesions about 1/8 inch in diameter. As lesions age, they become purple and necrotic, and sometimes abscise, leaving a shot-hole appearance. Multiple lesions result in leaf chlorosis (yellowing) and defoliation.

Cankers are visible in early spring as slightly raised, blister-like areas along the twig. If the terminal bud region becomes infected, the shoot tip becomes a blackened canker that may extend downward along the shoot for about an inch. In this case, the terminal bud is killed.

Fruit symptoms are first observable three to five weeks after petal fall, and later appear as depressed, brownish lesions, sometimes accompanied by pits, cracks, or exuding gum. Up to 39% of fruit can be infected by bacterial spot.

## Chemical Control

The two to four week period immediately after petal fall is critical for both early foliage and fruit infection. Thus, to properly control fruit infection, sprays should be applied from petal fall until 15 days before harvest. **Mycoshield 17WP** - 1-1,5 lb/acre and **Tenncop 5E** - 4-8 oz/acre in the Shuck-Split, First, Second, Third, Fourth, Fifth, and Sixth Cover provide satisfactory disease control.

In addition to the protective sprays mentioned above, there is some evidence that early applications just before bud-swell and prior to bloom can help to reduce the overwintering epiphytic inoculum on tree surfaces. These sprays lower the bacterial population, thereby decreasing the likelihood of infection of newly emerging leaves and fruit. Also, autumn applications during leaf drop may be beneficial in preventing canker formation. Fixed copper materials can be used at both these times.

**Brown Rot** - Infection caused by *Monilinia fructicola* occurs at bloom or during the preharvest period. Bloom infection results in blossom blight a necrosis of flowers. Once a flower is infected, the fungus can also proceed into the stem and cause a canker. A spore produced on these flowers and cankers then becomes the inoculum for subsequent infection during the preharvest fruit rot phase.

#### Chemical Control

Normally, two sprays are applied during the bloom period, the first at 5-10% bloom and the second at full bloom. The most effective fungicides are: **Abound 2F** - 12-15 oz/acre, **Bravo WS** - 3-4 pt/acre, **Captan 50WP** - 4 lbs/acre, **Elite 45DF** - 5 oz/acre, **Funginex 1.6EC** - 36-48 oz/acre, **Indar 75WSP** - 2 oz/acre, **Nova 40W** - 2.5-6 oz/acre, **Orbit 3.6EC** - 4 oz/acre, **Rovral 50WP** - 1-2 lbs/acre, **Sulfur, actual** - 10-12 lbs/acre, and **Vanguard WG** - 5 oz/acre. If the weather is very dry, only one spray may be needed. Conversely, if much rainy weather is encountered, a third spray at petal fall may be desirable.

As the fruit softens during the ripening process, it becomes more susceptible to brown rot. Fungicides are applied at regular intervals during this period. The first spray is applied at 14-21 days preharvest, or at first color. Usually, only two sprays at 7-14 days apart are needed, but a third spray may be necessary in the event of very wet weather. Recommendations include one of the first six above mentioned fungicides, and as well **Benlate 50WP** - 0.5 lb/acre or **Topsin-M 70WP** - 0.5 lb/acre plus one of the following: **Captan 50WP** - 2 lbs/acre or **Sulfur, actual** - 6 lbs/acre. A final application of a systemic material just before harvest is also a good practice to protect fruit during shipping and packing operations. Fungicides differ in spray and preharvest intervals.

Insect feeding injury increases brown rot infection; therefore, adequate insecticide protection helps suppress injury. Also, experiments indicate that brown rot is most difficult to control where peach trees make excessive growth. In such orchards, nitrogen-containing fertilizers should be used sparingly.

Special attention to brown rot control is required where trees are planted closely or where orchards are surrounded by woods. Such conditions reduce air drainage, and dew or rain evaporates more slowly from blossoms and fruit than where air drainage is better.

**Powdery Mildew** - The fungus *Sphaerotheca pannosa* causes powdery mildew of peach and nectarine. This is the same pathogen that causes mildew on roses. Sporulating colonies of this fungus have been observed on multiflora roses growing wild along woods adjacent to orchards.

#### Chemical Control

Since the fruit becomes resistant to infection shortly before pit hardening, infections generally occur between pink-bud and third cover sprays. However, once lesions are established, they will continue to expand in size. **Sulfur** - 4 lbs/acre applied when needed, provides reasonably good control. **Funginex 1.6EC** - 36-48 oz/acre, **Nova 40W** - 10-12 lbs/acre, and as well a combination of **Benlate 50WP** - 0.5 lb/acre or **Topsin-M 70WP** - 0.5 lb/acre plus **Captan 50WP** - 2 lbs/acre or **Sulfur, actual** - 6 lbs/acre applied when needed are extremely effective.

**Rusty Spot** - The fungus that causes this disease is believed to be the apple powdery mildew pathogen, *Podosphaera leucotricha*. Consequently, the disease can be anticipated in blocks adjacent to mildew susceptible apple blocks.

Fruit infections can occur throughout the growing season, but are most common at shuck-split and shuck-off. Fruit not protected at these critical times may become 100% infected, even if a good spray program is employed during the remainder of the year. The varieties most susceptible to the disease are Rio-So-Gem, Jefferson, Jerseyqueen, Biscoe, Loring, Early Loring, Redskin, Jerseyglo, and Garnet Beauty.

Since it is a powdery mildew disease, dry weather favors sporulation and spread of the mildew spores. Periods of heavy or frequent rainfall are less favorable. Also, moderate winters favor overwintering of the fungus on apple, thus providing higher inoculum levels for rusty spot in neighboring peach blocks. Rusty spot damage levels can exceed 23% of fruit infected at harvest.

#### Chemical Control

**Nova 40W** - 2.5-6 oz/acre applied when needed is considered the best material for disease control.

**Scab** - Peach Scab is caused by the fungus *Cladosporium carpophilum*. It over-winters in twig cankers produced on current season's twigs. Spores are released around shuck split and for the remainder of the season.

The infection process begins each year from spores produced in cankers formed on last year's growth. The spores are not readily released into the air until they become wetted. The period between infection and visual appearance of the disease on the fruit is very long, from 40 to 70 days. Because of the long period between infection and visual symptoms of the disease, early maturing varieties may be harvested before the fruit spots are visible to the naked eye. Infections can occur on the fruit, green twigs, and leaves.

Cankers formed on current season twigs are light brown, diffuse, small (1/16 to 1/8 inches in diameter) initially, and later increase in size, becoming circular in outline and turning a darker brown color. A slightly raised bark callus surrounds the margin of the lesion. In the spring, velvety-textured, olive-colored spots appear within the lesion.

On the fruit, the tiny spots appear around third cover (early July in southern counties) when the fruit are about one-half their final size. The spots develop quickly into very dark, olive-colored, circular spots. Later the spots appear almost black in color. The spots do not "break" the skin, as do the fruit spots caused by bacterial spot. However, the skin frequently cracks open in the areas where numerous infected spots occur, and the Brown Rot or Rhizopus Rot fungus then attacks the flesh of the fruit. The spots are invariably more numerous on the stem end of the fruit. This is the result of where the spores land most frequently on the fruit and to the generally higher wetness and humidity, which occurs at the stem end of the fruit. Damage to peaches caused by scab can range 30-45%.

#### Chemical Control

**Benlate/Topsin-M** (0.5 lb/100 gal), when applied at petal fall, has resulted in "burn out" of many of the overwintering lesions on the twigs. Thus, disease pressure can be measurably reduced as a result of a lower inoculum level. Fruit infections are most common from shuck-split through third cover. Foliar sprays with **Abound SC** - 8-9 oz/acre, **Bravo WS** - 3-4 pt/acre, **Captan 50WP** - 4lbs/acre, and **Topsin-M 70WP** plus **Captan 50WP** - 2 lbs/acre at Scuck-Split, First, Second, Third, and Fourth Cover are effective in protecting the fruit from infection, and a single fungicide spray applied around first cover will provide reasonably good control of twig infections in non-bearing blocks.

The disease is troublesome in commercial blocks when the trees did not receive a regular spray program in the preceding year. Where the disease is troublesome, half rates of **Benlate** or **Topsin-M** in combination with **Sulfur** or **Captan** give good control. **Bravo** is also a very effective material and has good retention capabilities. Sprays should be applied from shuck-split through third cover.

## Post Harvest Control Practices:

To prevent fruit rot development during storage and in marketing channels, postharvest fungicide treatment is conducted. Hydrocooling fruit before placing in cold storage with **Agclor 310 (12.5%)** - 0.75 gal for 1000 ppm, household bleach (5.25%) - 1.8 gal for 1000 ppm, or **HTH Chlorine (65%)** - 1.33 lb for 1000 ppm has proven to be one of the best controls.

To avoid postharvest peach skin discoloration (inking), hydrocoolers and dumptanks should be kept as clean as possible, with the pH of water in hydrocoolers and dumptanks between 6.5 and 7.0. Equipment should be checked for loss of ammonia, since leaks in the refrigeration system can also stimulate inking. In reduction of discoloration, chlorine levels of 120 ppm have shown excellent results.

## Nematodes (2, 5)

Nematodes are microscopic roundworms that live mainly in soil and plant tissue. Plant parasitic nematodes feed on plants by puncturing and sucking the cell contents with a stylet mouthpart. They can reduce the vigor and yield of trees, and as well as transfer virus diseases like tomato ringspot virus (TmRSV) that debilitates and kills trees.

Plant-parasitic nematodes are always a problem where peaches follow peaches. Where nematodes are troublesome, trees do not grow as vigorously. Nematode feeding increases the incidence of peach decline, and it can increase the incidence of stem pitting.

### Chemical Control

Preplant nematicides **Basamid** - 222-265 lbs/acre, **Nemacur** - 2.5 gal/acre, **Telone II** - 36-48 gal/acre, **Telone C-17** - 30-40 gal/acre, **Vapam** 50-100 gal/acre, and **Vydate L** - 3-4 gal/acre are used to promote tree vigor and to prevent the replant problem. Postplant treatments with **Nemacur** - 2.5 gal/acre and **Vydate L** - 2 pt/acre reduce tree loss from peach decline and stem pitting. All nematicides are fumigants except **Nemacur** and **Vydate**. Rates are for light, sandy soils. Heavier soils require higher rates.

Nematodes build up and reach damaging levels by the end of the second growing season when fumigant-type nematicides are used. The nematode buildup may occur at the end of the first growing season with nonfumigant-type nematicides. When sufficient nematode populations are present, postplant nematicide treatments are needed yearly to prevent tree loss.

Soil fumigants can be applied any time the soil temperature is at least 55°F at the 12-inch depth. Generally, soil temperatures reach this point from mid-April to mid-November in southern counties and from mid-April to early November in northern counties. During mid-summer, soil temperature may become too high for successful treatment (90°F). After making the application, soil should be shallow cultivated and irrigated with a half-inch of water.

Nonfumigant types of nematicides are formulated as sprayable materials. Sprayable soil-applied nematicides can be applied with a properly calibrated weed sprayer, and they have been successfully used in combination with all of the herbicides commonly used on tree fruit. To prevent injury to nontarget organisms, all of the soil-applied nematicides should be shallow incorporated shallowly in the soil immediately after application. They must enter the soil water and contact the nematode to effect control. As nonfumigants, soil temperature and soil moisture are not so critical for satisfactory control. Satisfactory control has been obtained with applications any time between mid-March and late November when the ground is not frozen. The nonfumigant nematicides presently cleared for use on tree fruit all possess some systemic activity. Consequently, when they are applied to soils, the ground should be weed-free for maximum control.

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TABLE 1. Insecticides and miticides used to control New Jersey Peach Pests: 1998

Arthropod Pest	AMBUSH	POUNCE 25WP	POUNCE 3.2EC	ASANA XL .66EC	AZINPHOS METHYL 50V	GUTHION 2S	GUTHION 50PVA	SNIPER 50PVA
European Red Mite								
Two Spotted Spider Mite								
San Jose Scale	x	x	x	x	x	x	x	x
Oriental Fruit Moth		x	x	x	x	x	x	x
Plum Curculio	x	x	x	x	x	x	x	x
Green Peach Aphid	x	x	x	x				
Black Peach Aphid	x	x	x	x				
Catfacing Insects(TPB,etc.)	x	x	x	x	x	x	x	x
Western Flower Thrips	x		x					
Japanese Beetle		x	x	x	x	x	x	x
Tufted Apple Bud Moth	x	x	x	x	x	x	x	x
Lesser Peach Tree Borer	x	x	x	x		x	x	x
Peach Tree Borer	x	x	x	x		x	x	x
# Acres Treated	10.8	118.8	270	3996	1706.4	43.2	5896.8	2948.4
% Acres Treated	0.1	1.1	2.5	37	15.8	0.4	54.6	27.3

TABLE 1. Cont.

Arthropod Pest	LANNATE 90SP	LANNATE LV	LORSBAN 4EC	CARZOL SP	IMIDAN 70WP	PENNCAP M	DIPEL	SUNSPRAY 6E
European Red Mite				x				x
Two Spotted Spider Mite				x				x
San Jose Scale	x	x	x		x	x		x
Oriental Fruit Moth	x	x			x	x	x	
Plum Curculio	x	x			x	x		
Green Peach Aphid	x	x	x					x
Black Peach Aphid	x	x						x
Catfacing Insects(TPB,etc.)	x	x		x	x	x		
Western Flower Thrips	x	x		x				
Japanese Beetle	x	x			x	x		
Tufted Apple Bud Moth	x	x			x	x	x	
TABLE 1. Cont.								
Lesser Peach Tree Borer	x		x		x	x		
Peach Tree Borer	x	x	x		x	x		
# Acres Treated	5680.8	1447.2	1674	75.6	2991.6	1360.8	10.8	1695.6
% Acres Treated	52.6	13.4	15.5	0.7	27.7	12.6	0.1	15.7

TABLE 1. Cont.

Arthropod Pest	CARBARYL 4L	SEVIN 50W	SEVIN 80S	SEVIN WSP	SEVIN XLR	ENDOSULFAN 3EC	THIODAN 3EC	THIODAN 50WP
European Red Mite								
Two Spotted Spider Mite								
San Jose Scale	x					x	x	x
Oriental Fruit Moth	x	x	x	x	x	x	x	x
Plum Curculio	x	x	x	x	x	x	x	x
Green Peach Aphid						x	x	x
Black Peach Aphid						x	x	x
Catfacing Insects(TPB,etc.)	x	x	x	x	x	x	x	x
Western Flower Thrips								
Japanese Beetle	x	x	x	x	x			
Tufted Apple Bud Moth								
Lesser Peach Tree Borer						x	x	x
Peach Tree Borer						x	x	x
# Acres Treated	86.4	507.6	918	259.2	43.2	32.4	10.8	486
% Acres Treated	0.8	4.7	8.5	2.4	0.4	0.3	0.1	4.5

TABLE 1. Cont.

Arthropod Pest	APOLLO SC	VENDEX 50WP	MALATHION 25WP
European Red Mite	x		
Two Spotted Spider Mite	x	x	
San Jose Scale		x	x
Oriental Fruit Moth			x
Plum Curculio			x
Green Peach Aphid			x
Black Peach Aphid			x
Catfacing Insects(TPB,etc.)			x
Western Flower Thrips			
Japanese Beetle			x
Tufted Apple Bud Moth			x
Lesser Peach Tree Borer			x
Peach Tree Borer			x
# Acres Treated	2354.4	172.8	0
% Acres Treated	21.8	1.6	0

TABLE 2. Fungicides and bacteriacide used to control New Jersey Peach Diseases: 1998

Disease Pest	Benlate 50WP	Bravo 720	Bravo Ultrex	Bravo Weatherstik	Terranil 6L	Captan 50W	Captan 80W	Elite 45DF
Bacterial Spot								
Brown Rot	x	x	x	x	x	x	x	x
Powdery Mildew								
Rusty Spot								
Scab	x	x	x	x	x	x	x	
Leaf Curl		x	x	x	x	x	x	
Rhizopus Rot						x		x
Pytophthora								
# Acres Treated	1478.0	2934.6	72.7	1524.3	69.7	8753.9	743.9	116.4
% Acres Treated	13.7	27.2	0.7	14.1	0.6	81.1	6.9	1.1

TABLE 2. Cont.

Disease Pest	Ferbam 76WDG	Indar 75WSP	Champ	Copper Sulfate	Kocide DF	Lime Sulfur	Nucop 3L	Nucop DF
Bacterial Spot			x	x	x	x	x	x
Brown Rot	x	x						
Powdery Mildew								
Rusty Spot								
Scab		x						
Leaf Curl	x		x	x	x	x	x	
Rhizopus Rot								x
Pytophthora								
# Acres Treated	115.3	2330.8	26.3	1458.1	1666.4	295.6	1183.8	307.1
% Acres Treated	1.1	21.6	0.2	13.5	15.4	2.7	11.0	2.8

TABLE 2. Cont.

Disease Pest	Orbit 3.6EC	Ridomil 2E	Ronilan Df	Rovral 4F	Rovral WP	Sulfur 90G	Sulfur WP	Syllit 65WP
Bacterial Spot								x
Brown Rot	x		x	x	x	x	x	
Powdery Mildew						x	x	
Rusty Spot								
Scab						x	x	
Leaf Curl								
Rhizopus Rot			x	x	x			
Pytophthora		x						
# Acres Treated	8036.7	20.2	408.8	320.3	33.9	134.5	8275.2	377.2
% Acres Treated	74.4	0.2	3.8	3.0	0.3	1.2	76.6	3.5

TABLE 2. Cont.

Disease Pest	Nova 40W	Topsin WSB	Ziram 76DF	Ziram 76G
Bacterial Spot				
Brown Rot	x	x	x	x
Powdery Mildew	x			
Rusty Spot	x			
Scab		x	x	x
Leaf Curl				
Rhizopus Rot				
Pytophthora				
# Acres Treated	5462.4	958.2	1900.8	1737.6
% Acres Treated	50.6	8.9	17.6	16.1

TABLE 3 Insecticides and fungicides used in NJ peach production

Chemical Name	Trade Name	Formulations	PHI	REI	Applications per season
Ambush, Pounce	permethrin	25WP, 3EC	7	24	1
Apollo	clofentazine	SC	21	12	1
Asana	esfenvalerate	0.66EC	14	24	1
Azinphos methyl, Guthion, azinphos methyl		2S, 50WP, 70WP, 50PVA	21	24	6
Carbaryl, Sevin	carbaryl	50W, 80S, WSP, XLR, 4L	1	12	2
Carzol	formetanate HCL	SP	21	24	1
Dipel	B.t.	2X, DF, ES	0	4	1
Endosulfan, Thiodan	endosulfan	3EC, 50WP	30	48	1
Imidan	phosmet	70WP	14	24	5
Lannate	methomyl	90SP, LV	4	24	2
Lorsban	chlorpyrifos	4EC	PB	24, 12	1
Malathion	malathion	25WP	7	12	1
Pennacp M	methyl parathion	FM	28	48	3
Sunspray	oil	6E	0	4	1
Vendex	fenbutatin oxide	50WP	14	24	1
Benlate	benomyl	50WP	3	24	3
Bravo, Terranil	chlorothalonil	720, Ultrex, Weatherstik, 6L	FC	48	2
Captan	captan	50W, 80W	0	96	7
Champ, Kocide, Nucop	copper hydroxide	WP, DF, 3L, DF	21	24	1
Copper sulfate	copper sulfate	WP	21	24	2
Elite	tebuconazole	45DF	0	12	1
Ferbam	carbamate	76WDG	21	12	1
Indar	fenbuconazole	75WSP	0	12	2
Lime Sulfur	lime sulfur	WP	0	48	1
Mycoshield	terramycin	AT	21	12	3
Nova	myclobutanil	40W	0	24	3
Orbit	propiconazole		0	24	2
Ridomil	metalaxyl	2E	Dormant	12	1
Ronilan	vinclozin	DF	14	12	2
Rovral	iprodione	4F, WP	PF	12	1
Sulfur	sulfur	90G, WP	0	12	8
Syllit	dodine	WP, 65WP	15	48	1
Tennacop	copper	5E	0	24	11
Topsin M	thiophanate methyl	WSB	1	12	2
Ziram	ziram	76DF, 76G	14	48	1

TABLE 4. Herbicides used to control weeds in New Jersey Peach orchards: 1997

<b>Weed Pest</b>	2,4-D	Fusilade Diuron (fluazifop-butyl)	Roundup (glyphosate)	Devrinol (napropamide)	Solicam (norflurazon)	Surflan (oryzalin)	Goal (oxyfluorfen)	
Canada Thistle (P)	s		x					
Camphorweed (B)	x		x					
Dandelion (P)	x		x					
Goldenrod Species (P)	s		x					
Horseweed (Marestail) (B)	x		x					
Poison Ivy (P)	s		x					
Quackgrass (P)		x	x		s	x		
Virginia Creeper (P)	x		x					
Yellow nutsedge (P)					s			
White Heath Aster (P)	s		x					
Annual Grasses: (A)		s	x	x	x	x		
Carpetweed (A)	x	x	x	x		x	x	
Cockleblur, common (A)	x		x					
Cranesbill (A)	x		x					
Galinsoga, hairy (A)	x	x	x				x	
Jimsonweed (A)		x	x		s		x	
Lambsquarter, common (A)	x	x	x	s	s	x	x	
Morning glory sp. (A)	x	x						
Nightshade, eastern black (A)	x	x	x				x	
Shepherdspurse (A)	x	x	x				x	
Pigweed sp. (A)	x	x	x	x		x	x	
Purslane, common (A)	x	x	x		x	x	x	
Ragweed, common (A)		x			x		x	
Smartweed, Pennsylvania (A)		s	x				x	
Velvetleaf (A)	x	x	x				x	
% Acres Treated: in row	25	80	2	25	5	25	5	1
Sod Middle	10	0	0	0	0	0	0	0

TABLE 4. Cont

<b>Weed Pest</b>	Gramoxone Prowl (paraquat) dimeth		Kerb (pronamide)	Simazine	Sinbar (terbacil)
Canada Thistle (P)					
Camphorweed (B)					
Dandelion (P)					
Goldenrod Species (P)					
Horseweed (Marestail) (B)					
Poison Ivy (P)					
Quackgrass (P)			x		
Virginia Creeper (P)					
Yellow nutsedge (P)	x				s
White Heath Aster (P)					
Annual Grasses: (A)				s	
Carpetweed (A)		x	x	x	x
Cockleblur, common (A)	x			x	
Cranesbill (A)					x
Galinsoga, hairy (A)	x			x	x
Jimsonweed (A)	x			x	x
Lambsquarter, common (A)	x	x	x	x	x
Morning glory sp. (A)	x			x	x
Nightshade, eastern black (A)				x	x
Shepherdspurse (A)				x	x
Pigweed sp. (A)	x	x	x	s	
Purslane, common (A)	x	x	x	x	x
Ragweed, common (A)	x			x	x
Smartweed, Pennsylvania (A)				x	x
Velvetleaf (A)				x	x
% Acres Treated: in row	60	10	2	50	60
Sod Middle	0	20	0	0	0