

New England Strawberry Pest Management Survey Summary

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The following summarizes a survey that was distributed by Alan Eaton, University of New Hampshire to New England growers in the fall of 2004. A Dillman survey methodology was used to design and conduct the survey.

Table: Summary of New England Strawberry Pest Management Survey Returns

State	#Surveys Sent	#Growing Strawberries	#Strawberry Acres
MA	310	40	118
ME	69	14	110
NH	39	21	77
CT	45	12	70
VT	14	4	23
RI	9	2	22
Total	486	93	420

Crop Information for Strawberries

Massachusetts led the reported strawberry crop acreage in 2004 with 118 acres. Maine followed with 110 acres, New Hampshire with 77 acres, Connecticut with 70 acres, Vermont with 23 acres, and Rhode Island with 22 acres.

The majority of growers (70) throughout the region reported an average yield of 8,757 pounds per acre per year (370 acres).

U-Pick accounted for 58% of the strawberry crop harvest, followed by the retail market at 27%, wholesale market at 14%, and remaining harvest split between processing, home use, and Community Supported Agriculture programs (CSA).

Horticultural Management for Strawberries

Fourteen percent of the growers used **composted manure** and 11% used **fresh manure**. Growers used **dormant plants** (69%) and **plug plants** (14%). **Overhead irrigation** was used by 70% of the growers and **drip irrigation** was used by 32% of the growers. Thirty-eight percent of the growers reported using **row covers** for their strawberry crop. Other horticultural practices included **importation of bee hives** (38%), **raised beds** (46%), and use of **black plastic mulch** (24%).

Seventy-two percent of the growers used **soil samples** to determine their **fertilizer** needs in most years. Forty percent of the growers took soil samples annually.

Thirty-one percent of the growers used **tissue analysis** to determine **fertilizer** needs in most years. Sixteen percent of the growers used tissue analysis on an annual basis.

Strawberry Crop Pest Management Overview

The average number of annual pesticide applications for insect pests was 2.12, for mites 0.61, for diseases 3.08, and for weeds 2.09.

Growers ranked the frequency of insect pests with 63% managing **tarnished plant bug**, 40% managing **strawberry bud weevil**, and 28% managing **root weevils** on an “annual” basis. But most growers reported that cutworms (77%), thrips (70%), cyclamen mite (64%), strawberry leafroller (61%), and strawberry root worm (57%) were “rarely a problem” or “never a problem” in strawberries.

Annual broadleaf weeds were an “annual” problem for 88% of the growers, followed by annual grasses at 81%, perennial broadleaf weeds at 73%, and perennial grasses at 55%.

“Annual” vertebrate pest problems included **deer** for 44% of the growers, followed by **birds** at 25%, and **voles** at 7%.

Sixty-nine percent of the growers controlled **gray mold** annually, followed by **powdery mildew** by 31% and **leaf spot** by 30%. But most growers reported that **verticillium wilt** (62%), **red stele** (59%), and **bacterial angular leaf spot** (57%) were “rarely a problem” or “never a problem” in strawberries.

Insect Pest Management for Strawberries

Pesticide applications were applied to 87% of the strawberry crop to manage **tarnished plant bug**. Brigade was used on 38% of the acreage. Growers (34%) used Thiodan on 35% of the acreage, followed by Danitol on 17%, Dibrom and malathion on 15%, and Phaser on 13%. The majority of growers used full rates and reported “excellent” or “good” control with these products.

Strawberry bud weevil was treated with insecticides on 64% of the acreage. Growers (18%) used Brigade on 34% of the acreage. Guthion was used on 21% of the acreage, followed by Sevin on 13%, and Sniper on 1%. The majority of growers used full rates and reported “excellent” control with these products.

Pesticide applications were applied to 32% of the strawberry crop to manage **twospotted spider mite**. Growers (12%) used Agrimek on 14% of the acreage. Brigade was used on 9% of the acreage, followed by Dibrom on 7% and Danitol on 6%. Kelthane, Acramite and oil were used on less than 3% of the strawberry acreage. The majority of growers used full rates and reported “good” control with these products.

Leaf hoppers were treated with insecticides on 30% of the acreage. Growers (16%) used malathion on 16% of the acreage. Sevin was used on 9% of the acreage, followed by Thiodan on 6%, and Pounce on 3%. The majority of growers used full rates and reported “good” control with these products.

Pesticide applications were applied to 28% of the strawberry crop to manage **slugs** by 25% of the growers. Metaldehyde Bait was used on 25% of the acreage. Sluggo and Trans End Bait were used on less than 2% of the acreage. Growers used both full and reduced rates and reported “good” control with these products.

Root weevils were treated with insecticides on 27% of the acreage. Growers (12%) used Brigade on 11% of the acreage. Malathion and Admire were used on 3% of the acreage and Danitol, methyl bromide, Diazinon, and Asana were used on less than 2% of the acreage. The majority of growers used full rates and reported “excellent” and “good” control with these products. Five growers used predatory mites with mixed results.

Pesticide applications were applied to 25% of the strawberry crop to manage **spittlebug**. Growers (9%) used Sevin on 11% of the acreage. Brigade was used on 6% of the acreage, followed by Thiodan on 3%, and Ambush and methyl bromide on 2%. Guthion, carbaryl, and endosulfan were used on less than 2% of the acreage. The majority of growers used full rates and reported “excellent” and “good” control with these products.

Strawberry leaf roller was treated with insecticides on 19% of the acreage. Growers (8%) used Brigade on 14% of the acreage. Guthion and Sevin was used on 3% of the acreage, Malathion was used on 2%, and Dibrom was used on 1% of the acreage. The majority of the growers reported using full rates and had “good” control with these products.

Pesticide applications were applied to 17% of the strawberry crop to manage **sap beetles**. Growers (11%) used Brigade on 13% of the acreage. Danitol was used on 5% of the acreage, followed by Cythion on 3%, and Sevin on 2% of the acreage. The majority of growers reported using both full and reduced rates and had “good” control with these products. Three growers used an alternative strategy of *picking and cleaning the field* on 2% of the acreage. Growers reported “good” results with this method.

White grubs were managed on 8% of the strawberry acreage. Sevin was used on 4% of the acreage and Admire was used on 3% of the acreage. Growers used full rates and reported mixed control with these products.

Pesticide applications were applied to 8% of the strawberry acreage to manage **cutworms**. Sevin was used on 4% of the acreage, followed by methyl bromide on 2%; Guthion, Danitol and Diazinon on less than 1%. The majority of growers used full rates and reported “excellent” control with these products.

Strawberry rootworm was managed on 7% of the strawberry acreage. Brigade was used on 4% of the acreage and Danitol was used on 3% of the acreage.

Disease Management for Strawberries

Seventy-seven percent of the growers indicated that they practiced **crop rotation** to manage diseases and viruses. Many growers (34%) practiced a three-year rotation.

Sixty-three percent of the growers used **cultural practices** to control diseases. Growers used **mulch** (19%), **raised beds** (17%), and **narrow rows** (15%). Several other practices were reported including using weed control, wide plant spacing, well-drained soils, drip irrigation, and renovation in the management of diseases. Most growers reported “excellent” and/or “good” disease management using these practices.

Gray mold was a disease managed by 74% of the growers on 87% of the strawberry crop. Growers (55%) used captan on 70% of the acreage. Switch was used on 41% of the acreage, followed by Elevate on 38%, Elevate with captan on 34%, Topsin-M with captan on 25%, Cabrio on 24%, Topsin-M on 14%, Pristine on 13%, and Thiram and Quadris on 12%. Elevate with Thiram, Benlate, and Captivate were used on less than 10% of the acreage. The majority of growers used full rates and reported “excellent” control with these products.

Pesticide applications were applied to 52% of the strawberry crop to manage **powdery mildew**. Growers (20%) used Topsin-M on 24% of the acreage. Cabrio was used on 24% of the acreage and Quadris was used on 18% of the acreage. Sulfur, Pristine, Nova, captan, Messenger, and Oxidate were used on less than 4% of the acreage. The majority of growers used full rates and reported both “excellent” and “good” control with these products.

Leaf spot was a disease managed by 37% of the growers on 44% of the strawberry crop. Growers (22%) used captan on 33% of the acreage. Cabrio was used on 24% of the acreage, followed by Topsin-M on 16%, and Quadris on 12%. Syllit, Switch and Nova were used on less than 3% of the acreage. The majority of growers used full rates and reported “excellent” control with these products.

Pesticide applications were applied to 35% of the strawberry crop to manage **anthracnose**. Growers (16%) used Captan on 24% of the acreage. Switch was used on 25% of the acreage, followed by Cabrio on 17%, Quadris on 14%, Topsin-M on 13% and Thiram on 10%. The majority of growers used full rates and reported both “excellent” and “good” control with these products.

Leather rot was a disease managed by 27% of the growers on 34% of the strawberry crop. Growers (19%) used captan on 27% of the acreage. Quadris was used on 7% of the acreage and Alette was used on 4% of the acreage. Ridomil, Thiram, and Oxidate were used on less than 3% of the acreage. The majority of growers used full rates and reported both “excellent” and “good” control with these products.

Pesticide applications were applied to 22% of the strawberry crop to manage **leaf blight**. Growers (13%) used Topsin-M on 19% of the acreage. Syllit, Nova, Captan, and Thiram were

used on less than 4% of the acreage. The majority of growers used full rates and reported “good” control with these products.

Leaf scorch was a disease managed by 17% of the growers on 21% of the strawberry crop. Growers (13%) used Topsin-M on 15% of the acreage. Syllit, Captan, Nova, and Pristine were used on less than 3% of the acreage. The majority of growers used full rates and reported both “excellent” and “good” control with these products.

Weed Management for Strawberries

Fifty-two percent of the growers reported using **cover crops** for weed management in strawberries. Growers (39%) used winter rye and reported “good” results for weed suppression. Others used oats (20%) and buckwheat (8%) and reported “excellent” and/or “good” weed suppression.

Growers (95%) used other cultural weed management strategies including **hand weeding** (84%), **cultivation** (82%), **hoeing** (74%), **mulching** (72%), **mowing** (40%), and using **living mulch in aisles** (12%). Most reported excellent and/or good weed management.

Pre-plant weed control herbicide applications were applied by 37% of the growers on 41% of the strawberry acreage. Growers (32%) used Roundup Ultra on 39% of the acreage. Gramoxone Max, methyl bromide, Vapam, Dacthal, Goal and Sinbar were used on less than 5% of the acreage. Growers used both full rates and reported “excellent” control.

Herbicide applications were applied to 82% of the strawberry acreage to provide **pre-emergence weed control**. Growers (45%) used Sinbar on 67% of the acreage. Devrinol was used on 65% of the acreage, followed by Dacthal on 15%, and Goal on 12%. Gramoxone, methyl bromide, and 2,4-D were used on less than 3% of the acreage. Growers used full and reduced rates and reported “good” control with these products.

Post-emergence weed control herbicide applications were applied by 67% of the growers on 70% of the strawberry acreage. Growers (35%) used Amine 4 on 37% of the acreage. Poast was used on 29% of the acreage, followed by Select on 15%, and Gramoxone Max on 16%. Scythe, Devrinol, Sinbar, Formula 40, Goal and Roundup were used on less than 4% of the acreage. Growers used full rates and reported “excellent” and/or “good” control.

Vertebrate Pest Management for Strawberries

Fifty-six percent of the growers used strategies to manage **deer**. Shooting was implemented by 20% of the growers, followed by electric fences (15%), other fences (11%), and dogs (4%). Most growers reported “good” control with these strategies.

Growers (34%) also used strategies to manage **birds**. Scare eye balloons were used by 8% of the growers and shooting by 6% of the growers. Most growers reported “good” control with these strategies. Various strategies including, owls, flash tape, scare devices, dogs, fire crackers, propane cannons, and reflective mirror were used with “good” and/or “poor” success.

Information for Pest Management Decisions

Seventy percent of the growers implemented **IPM practices** such as insect trapping and field sampling. Growers (50%) did their own **scouting**, but some had a private consultant (16%) or farm employee/family member (13%), to conduct the scouting. Those who used **sampling methods** used informal sample patterns (44%) or standardized sample patterns (30%) and used insect traps (27%).

Factors that were “very important” in choosing a pesticide were **effectiveness** (86%), **phytotoxicity** (80%), **toxicity** of pesticides (73%), potential **environmental impacts** (68%), impacts on **non-target organisms** (49%), **packaging** (37%), and **cost per acre** (32%).

Weather information was used frequently to make pest management decisions. Eighty-eight percent of the growers frequently use **rain forecasts**, followed by **wind speed forecasts** (67%), **rainfall totals** (53%), **humidity and/or leaf wetness hours** (40%), and **temperature** (34%).

Growers ranked the following sources information as being “very important” in making their pest management decisions – **New England Pest Management Guide** (73%), **University/Extension staff** (62%), **off-season education meetings** (57%), **newsletters** (52%), **other growers** (49%), **twilight meetings** (39%), **suppliers/dealers** (33%), **trade publications** (16%), and **web sites** (16%).

Of those growers who describe their crop production, 53% reported **IPM**, 45% **conventional**, and 13% reported **organic**.

Additional Survey Information

To obtain a copy of the survey and complete results please refer to the New England Pest Management Information Network website at www.pronewengland.org

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