Crop Profile: Peas in New York

***Introduction**:* Peas are a vegetable crop of major importance in NY. Just under 20,000 acres are produced, almost entirely for processing into frozen or canned products. A small percentage of the crop moves through fresh market channels, mostly within the state.

Peas are attacked by relatively few pests compared to most other vegetables, and pesticide use in peas is relatively low. Seed-treatment fungicides are critical for controlling seed decay, root rot, and some seed-borne diseases. Insect pests are infrequent in peas; weeds are by far the biggest pest problem. Without the registration of new, effective materials to replace them, the loss of MCPB or bentazon would have significant impacts on production and profitability. Producers have a great need for new herbicide registrations, especially for materials which will help control problem weeds such as Canada thistles and daisies.

Registration of new materials by the EPA, even those designated as "low risk", does not guarantee that NY growers will have immediate access to them. NYS Department of Environmental Conservation conducts their own in-depth reviews before registering new pesticides in NY, and may or may not register new materials for portions of or for the entire state.

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II. Basic Commodity Information

State Rank: 5
% U.S. Production: 8.4%
Acres Planted: 18,900
Acres Harvested: 18,200
Cash Value: $8,446,000
Yearly Production Costs: $400/acre (based on 1995 grower survey)
Production Regions: Processing pea acreage is located in western NY (Genesee, Orleans, Livingston, Monroe, and Wyoming Counties). Small plantings of peas are made for fresh market throughout much of upstate NY and on Long Island.
Cultural Practices: Peas are a cool-season crop that germinates at soil temperatures as low as 40^0 F and can tolerate moderate freezes. Planting can begin when the soil becomes tillable in late March or early April. A fertile, uniform, well-drained soil is preferred. Because peas mature faster on well-drained soils than on heavier, wetter soils, fields with a mixture of soil types should be avoided. Good drainage and soil structure are probably the most important factors determining success or failure in growing peas. Canning and freezing varietes are selected by the processor for grower use. Varieties with medium to large, plump pods are preferred for fresh market. Edible-pod varieties (snow peas and sugar snap peas) are also becoming very popular types for fresh market. Fresh market peas are often trellised. Planting begins as early as late March and can continue into mid-May. Crops are scheduled to mature before the hot dry weather in July. Seeding rates vary between varieties. For processing peas, seeding rates are adjusted to obtain 16-22 plants per yard of row. Row spacing is typically 7 inches. Fresh market peas are planted 18-20 plants per yard of row in rows 32 to 36 inches apart. If the weather is hot and dry during pod fill, overhead irrigation is sometimes used. Processing peas are harvested by machines that strip the pods from the plants, and then remove the peas from the pods. Snails and slugs can cause serious contamination problems. Once harvested, peas are transported rapidly (within a few hours at the most) to the processing plant. Fresh market peas are hand-picked.
Commodity Destination(s):
Processing: 99%
Fresh Market: 1%

III. Pest Information: Insects

1. Seedcorn maggot (*Delia platura*)

Frequency of Occurrence: Occasional.

Damage Caused: The larvae or maggots of this fly can burrow into pea seed, often destroying the germ, which causes seed death or poor germination. Injury is more likely on late planted peas.

% Acres Affected: Up to 50% at risk; 1-2% typically affected.

Pest Life Cycles: The seedcorn maggot is common throughout the northeastern US, where it overwinters primarily as a puparium in the soil. Eggs are laid just below the surface of recently plowed ground. High crop residue and fresh manure also attract flies which feed on the organic matter. The maggots hatch in four to seven days and feed primarily on decaying organic matter. After feeding for seven to 21 days, the larvae pupate in the soil, usually near the place of larval feeding. The entire life cycle is completed in three to four weeks. There may be three to five generations of seedcorn maggots per season, however the first is usually the only generation to cause any damage to peas.

Timing of Control: At planting.

Yield Losses: In severely affected fields, yields may be decreased by as much as 25% due to stand loss, but this is infrequent. Losses typically are <1%.

Regional Differences: None.

Cultural Control Practices: Most peas in NY are planted before seedcorn maggots become very active, and therefore they are not as great a problem as they are in other vegetables such as sweet corn, beans, and vine crops. No resistant varieties are available. Incorporating crop residues well before planting, and avoiding the spread of manure prior to planting can lower the risk of seedcorn maggot infestations.

Biological Control Practices: Predators, parasitoids, and pathogens help suppress infestations.

Post-Harvest Control Practices: None.

Chemical Controls:

Pesticide	% Trt.	Type of Appl.	Typical Rates	Timing	# of Appl.	PHI[1] days	REI hours
chlorpyrifos *(Lorsban)*	<1	grower-applied seed treatment	0.0625 lbs ai/cwt seed	at planting	1	60	12
fungicide seed treatments	See "Seed Decay and Root Rot" section, below. Fungicide seed treatments help control seedcorn maggot damage by helping seedlings emerge rapidly.						

1. PHI on this and all tables indicates the shortest actual number of days between application and harvest, not label PHIs.

Use in IPM Programs: As-needed use is consistent with Cornell IPM recommendations.

Use in Resistance Management: None reported.

Alternatives: Thiamethoxam, a new material from Novartis (trade name Adage) may be an effective alternative.

2. Pea Aphids (*Acyrthosiphon pisum*)

Frequency of Occurrence: Very sporadic.

Damage Caused: Pea aphids are sucking insects that feed directly on plant sap.

% Acres Affected: Less than 1% typically affected in any given year.

Pest Life Cycles: This aphid pest of peas overwinters as eggs in alfalfa and clover. In spring, eggs hatch into wingless parthenogentic females which, after reaching the adult stage, give birth to young nymphs, often ten to fourteen per day. Winged aphids appear at the second or third generation and fly to pea fields, often producing, under favorable conditions, 12 or more wingless generations in rapid succession throughout the summer. As peas become mature and less favorable for feeding, winged adults again appear, and many of these fly back to clover and alfalfa where males and egg-laying females are produced.

Timing of Control: Up to pod-fill.

Yield Losses: Usually very small, but in infrequent cases, when weather is dry, aphid populations can build up, weakening pea plants.

Regional Differences: None.

Cultural Control Practices: No resistant varieties available. Aphid populatuions decline rapidly during periods of heavy rainfall.

Biological Control Practices: Naturally occuring predators, parasitoids, and pathogens help suppress aphid populations.

Post-Harvest Control Practices: Crop debris should be destroyed as soon as possible after harvest (this occurs during mechanical harvesting of processing peas).

Chemical Controls: There are several insecticides for foliar insects labeled for peas in NY, including methyl parathion (Penncap-M), esfenvalerate (Asana), diazinon, carbaryl (Sevin), and methomyl (Lannate). Methyl parathion is used very occasionally, and the others are essentially never used on processing peas because insect damage is usually negligible. Fresh market producers may use them, although still very infrequently, for control of insects causing cosmetic damage.

Pesticide	% Trt.	Type of Appl.	Typical Rates	Timing	# of Appl.	PHI days	REI hours
methyl parathion *(Penncap-M)*	<1	foliar	0.5	as needed before pod filling	1	10	48

IV. Pest Information: Diseases

1. Seed Decay and Root Rots (*many species*)

Frequency of Occurrence: Annually.

Damage Caused: These soil-borne fungi can cause seed decay and death, thus lowering stand. In mature plants, these fungi attack roots, causing root decay, plant stunting, and lower yields. By diminishing the root system of the plant, these fungi make the plant much more susceptible to moisture and nutrient deficiency. Seed and seedling diseases are primarily caused by *Pythium ultimum* and *Rhizoctonia solani*. Root rot diseases (which also affect the stems of plants) are caused by *Fusarium, Pythium, Thielaviopsis,* and *Aschocyta* (stem rot).

% Acres Affected: 100%

Pest Life Cycles: *Pythium ultimum* and other species of Pythium have a wide host range and can survive in soil for many years as oospores. They are most damaging to seedlings during cool weather. *Theilaviopsis basicola* can cause severe root rot in peas in NY, alone or with *Fusarium solani*, a common soil fungus. Theilaviopsis produces both endoconidia and chlamydospores. *Rhizoctonia solani* is another common soil fungus with a very wide host range, including other vegetable crops. Aschocyta is seedborne.

Timing of Control: At planting.

Yield Losses: Can be as high as 100% in severely affected fields. Root rots are found in virtually every pea field in NY, and losses typically run from 1-30%, even when all available control measures have been taken.

Regional Differences: Fresh market plantings, especially in eastern NY and Long Island, are not affected as severely as processing peas in central and western NY.

Cultural Control Practices: Root rot is favored by short rotations. Peas should be planted only once every four years, and fields with a history of root rot should be avoided. Rotations with grain crops will improve soil structure and reduce disease severity. Poorly drained fields and compacted soils should be avoided.

Biological Control Practices: None.

Post-Harvest Control Practices: None.

Chemical Controls:

Pesticide	% Trt.	Type of Appl.	Typical Rates	Timing	# of Appl.	PHI days	REI hours
captan *(Captan)*	100	commercial seed treatment	0.08 lbs ai/cwt of seed	before planting	1	60	--
thiram *(Thiram)*	<1	commercial seed treatment	0.018 lbs ai/cwt of seed	before planting	1	60	--
mefenoxam *(Apron XL)*	<1	commercial seed treatment	0.1-0.2 fl. oz ai/cwt of seed	before planting	1	60	--

Use in IPM Programs: Use of commercially treated seed is consistent with Cornell IPM recommendations.

Use in Resistance Management: None reported.

Efficacy Issues: Captan has some activity against Pythium, Rhizoctonia and Fusarium. Fungicide seed treatments also help control seedcorn maggot by helping seedlings emerge rapidly.

Alternatives: Maxim (fludioxonil) may be an effective replacement for captan, but may need to be paired with mefenoxam for broader spectrum control.

2. Ascochyta Leaf Spot (*Ascochyta pisi*)

Frequency of Occurrence: Sporadic.
Damage Caused: Aschocyta causes leaf lesions with concentric ring patterns, as well as the damage it does to roots and stems (see "Seed Decay and Root Rots", above). The leaf blighting weakens the plant, and lowers yield.
% Acres Affected: 100% of fields are at risk, but typically only 1-2% affected in a given year.
Pest Life Cycles: The fungus is seedborne, and can overwinter in infected crop debris. Rainfall and heavy dews are important for inoculations and infection.
Timing of Control: At planting
Yield Losses: Can be up to 50% is severely infected fields, but this is infrequent.
Regional Differences: None.
Cultural Control Practices: No resistant varieties are available. Two- to three-year rotations can reduce disease severity.
Biological Control Practices: None.
Post-Harvest Control Practices: Disk and plow under crop debris immediately after harvest before the fungus can be dispersed by wind and rain.
Chemical Controls: Fungicide seed treatments (see "Seed Decay and Root Rot" section, above) provide some control of this disease by reducing inoculum associated with the seeds.

3. Fusarium Wilt (*Fusarium oxysporum* f.sp. *pisi*)

Frequency of Occurrence: Infrequent.
Damage Caused: Fusarium wilt causes the downward curling of leaves and stipules. Leaves and stems become brittle. Yellow to orange discoloration also occurs within the roots and stems. Weakened plants result in lowered yields.
% Acres Affected: 1-2%
Pest Life Cycles: This soil borne fungus may remain in the soil for up to ten years. Several races of the disease exist. Damage is highest when soil temperatures exceed 68^0 F.
Timing of Control: At planting; site selection.
Yield Losses: Usually small, 1-10%.
Regional Differences: None.
Cultural Control Practices: Rotation is relatively ineffective. Some varieties are resistant to certain strains. Timing planting to avoid higher soil temperatures can aid in disease control.
Biological Control Practices: None.
Post-Harvest Control Practices: None.
Chemical Controls: No pesticides are available to manage Fusarium wilt.

V. Pest Information: Weeds

1. Annual and Perennial Broadleaves and Grasses

Frequency of Occurrence: Annually.
Damage Caused: Reduced yields from weed competition, and loss due to interference with harvesting equipment. Crops can become contaminated with weed plant parts (e.g. nightshade berries, Canada thistle buds or daisy buds) during harvesting.
% Acres Affected: 100%
Pest Life Cycles: A wide range of annual and perennial weed species is present in pea fields in NY. Some of the more common ones include redroot pigweed, common lambsquarters, common ragweed, several nightshade species, yellow nutsedge, Canada thistle, daisies, and various annual and perennial grasses.
Timing of Control: Preplant, at planting, and postemergence.
Yield Losses: Can be as high as 100% in severely infested fields. Fields with infestations of weeds posing contaminant problems (Canada thistles, daisies) can be passed over for harvesting.
Regional Differences: While weed species spectra can vary regionally, weeds are a serious pest of peas throughout the state.
Cultural Control Practices: Cultivation is generally not useful in pea weed control because of the narrow row spacing. Some specialized cultivation equipment (tine weeders) may be effective, but are impractical since they pull up stones onto the soil surface. Small stones become a contaminant problem in harvested peas, and larger stones directly interfere with harvesting equipment. Banding of herbicides is also not useful in pea production because of the narrow row spacing.
Biological Control Practices: None.
Post-Harvest Control Practices: Application of herbicides and/or tillage after harvest can control perennial weeds.
Other Issues: Research on pea weed control is ongoing (Bellinder), with a focus on screening new herbicide materials for efficacy and crop tolerance, and fine-tuning rates and timing for cost-effective weed control.

Chemical Controls:

Pesticide	% Trt.	Type of Appl.	Typical Rates lbs ai/acre	Timing	# of Appl.	PHI days	REI hours
clomazone *(Command)*	<1	soil incorporated	0.5	preplant	1	60	12
trifluralin *(Treflan)*	4	soil incorporated	0.5	preplant	1	60	12
pendimethalin *(Prowl)*	0	soil incorporated	0.5-1.0	preplant	1	60	12
bentazon *(Basagran)*	90	foliar	0.5	postemergence; when peas have 3 pairs leaves	1	21	12
sethoxydim *(Poast)*	4	foliar	0.2	postemergence; when grasses are actively growing	1	15	12
quizalofop P-ethyl *(Assure II)*	<1	foliar	0.07	postemergence	1	30	12
MCPB *(Thistrol)*	80	foliar	0.5	postemergence; before three nodes from flowering	1	21	12
imazethapyr *(Pursuit)*	<1	soil incorporated, soil surface, or foliar	0.03-0.05	preplant, preemergence, or postemergence	1	30	4

Use in IPM Programs: Use of these materials is consistent with Cornell IPM recommendations. Post-emergence materials (bentazon, MCPB, sethoxydim, quizalofop P-ethyl) support the use of scouting and as-needed applications.

Use in Resistance Management: None reported.

Efficacy Issues: The listed herbicides have different but overlapping spectra of species control. Bentazon and MCPA are typically used together for control of broadleaf weeds including Canada thistle. Grasses are controlled either with sethoxydim or quizalofop P-ethyl. Producers have a great need for new herbicide registrations, especially for materials which will help control problem perennial weeds such as Canada thistle, daisies, and yellow nutsedge.

Alternatives: Several years of trials with metribuzin (Sencor) have shown that this may be a very useful herbicide alternative for peas. Other new herbicides under research include halosulfuron, sulfentrazone, imazamox, sulfentrazone, cloransulam, flumetsulam, imazethapyr, carfentrazone, flufenacet, an pendimethalin. The ability of these herbicides to control Canada thistle is of utmost importance.

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VI. References

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3. *Pest Management Recommendations for Commercial Vegetable and Potato Prodution, 1999.* Cornell Cooperative Extension, Cornell University. http://www.nysaes.cornell.edu/recommends/

4. *Vegetable Production Handbook.* 1994. Cornell Cooperative Extension, Cornell University.

5. Members of the New York State Pea Roundtable, comprised of producers, processors, consultants, researchers and Extension Educators, provided detailed information on pesticide use and usage patterns in NY peas. In addition, they provided perspective on industry needs, and reviewed drafts of this Crop Profile.