

Varroa mites

a guide to control methods in New York

Integrated pest management (IPM)

There are several different methods that can be used to control *Varroa* mites in New York. IPM is the recommended approach to mite control, as this strategy relies on a number of different control methods (genetic, cultural, and chemical) instead of relying on one method alone. Repeatedly using the same treatment for *Varroa* can increase the likelihood of mites developing resistance. Resistance has already been documented in New York State for the treatments Apistan® (fluvalinate) and CheckMite+® (coumaphos). IPM emphasizes that beekeepers monitor colonies regularly to learn mite levels and keep written records of these levels over time. To prolong mite population build up, beekeepers should introduce resistant or tolerant genetic stock and use cultural methods. Should mite levels ever reach or exceed the treatment threshold, beekeepers should apply an appropriate chemical treatments.

Why should I control *Varroa* mites?

1. *Varroa* mites, when left untreated, usually cause colony death between 6 months to two years. It is a major contributor to overwintering losses. Maintaining levels of *Varroa* below the treatment threshold all year long helps ensure colonies will survive until spring.
2. *Varroa* mites are associated with 6 different honey bee viruses: deformed wing virus, acute paralysis virus, sacbrood virus, Israeli acute paralysis virus, and Kashmir bee virus, and are known to vector most of these. Maintaining low levels of *Varroa* is the only recommended treatment for reducing the prevalence and spread of these viruses.
3. Controlling *Varroa* mites is one of the most important practices for responsible beekeeping. Drifting or robbing bees from infested colonies can introduce *Varroa* to your neighbor's colonies. Even if your neighbor regularly controls *Varroa*, new infestations can cause their mite levels to increase dramatically. Furthermore, viruses vectored by *Varroa* can infect wild bee populations in your area. Keeping healthy honey bees can help keep healthy pollinator populations.

Varroa management options throughout the seasons



Spring

Apivar®, Apiguard®, Api Life Var®,
Apistan®, Mite-Away Quick Strips®
Drone brood removal,
Brood interruption,
Requeening



Summer

Mite-Away Quick Strips®,
Drone brood removal,
Brood interruption



Autumn

Apivar®, Apiguard®, Api Life Var®
Apistan®, Mite-Away Quick Strips®
Hop Guard II®,
Oxalic Acid

Table 1. Methods for varroa control in New York. Carefully read all label instructions before using.

Synthetic Chemical Treatments (active ingredient)	Applying the Control Method	Best Time to Use
Apivar® (amitraz)	Insert 2 strips per brood chamber for six weeks. Remove honey supers while treatment is in use and wait 2 weeks after treatment ends before replacing them.	Spring and autumn. Do not use this treatment more than two times per year.
Apistan® (fluvalinate)	insert 2 strips into the brood chamber for six weeks. Remove honey supers while treatment is in use. Do not use beeswax for human consumption after treatment.	Spring and autumn. Daytime temperatures must be at $\geq 50^{\circ}$ F. Apistan® is not a recommended treatment in New York due to its adverse effects to bees, persistent residues in wax, and mite resistance.
CheckMite+® (coumaphos)	Insert 1 strip for every 5 frames of bees in brood chamber for 42-45 days. Do not use in cell builder colonies for producing queens. Remove honey supers before starting treatment and replace 14 days after treatment has ended.	Spring and autumn. Do not use more than twice a year. CheckMite+® is not a recommended treatment in New York due to its adverse effects to bees, persistent residues in wax, and mite resistance.
Natural Chemical Treatments		
ApiGuard® (thymol)	Place open tray on center top bars of the brood chamber for 10-14 days. After this time, replace with a new tray and leave for another 2-4 weeks. Remove honey supers while treatment is in use.	Spring and autumn. Use these treatments between 60° and 105° F. Apply in late afternoon or evening. Don't apply during nectar flow.
Api Life Var® (thymol, eucalyptor, menthol, camphor)	Break two wafers in half and place these four pieces in a square on the top bars of the hive, under the lid. Apply 3 times at 7-10 day intervals. Remove honey supers during treatment and wait one month following treatment to harvest honey.	Spring or autumn. Use when temperature is between $65-85^{\circ}$ F.
Mite-Away Quick Strips® (formic acid)	Place 2 strips on top bars of brood chamber for seven days. Can be used while honey supers are on.	Spring, summer, autumn. Use when temperature is between $50-92^{\circ}$ F.
Oxalic Acid (oxalic acid dehydrate)	Add oxalic acid to sugar syrup and drip 5mL between frames for a maximum of 50mL per colony using a syringe or applicator. Can also use fumigation method.	Autumn, or anytime when no capped brood is present.

Table 1 Continued. Methods for varroa control in New York. Carefully read all label instructions before using.

Natural Chemical Treatments Continued		
Hop Guard II® (hops beta acids)	Insert 1 strip per 5 frames of bees into the brood chamber for four weeks. Do not use more than 3 times a year. Can be used when honey supers are on. Do not harvest honey or wax from brood chambers.	Autumn. It's effectiveness in spring is not well known.
Cultural Methods		
Screen Bottom Board	Replace normal bottom board with screen bottom board. Best used if sticky board is introduced below the screen bottom board to catch falling mites and aid in monitoring. Mites fall off adult bees and are unable to crawl back up through the screen bottom board.	Spring, summer, autumn.
Drone Brood Removal	Insert a drone frame into the hive body to entice queens to lay drones. Varroa mites preferentially reproduce in drone brood over worker brood. Once brood is capped, remove the frame (don't forget!) and freeze overnight. Put the frame back in your hive body and allow workers to clean it out and the queen to lay again. Use this method 3-4 times a season, as drone production levels allow.	Early summer when drone production is high.
Brood Interruption	Produce a split or cage the queen for 1-2 weeks to interrupt brood laying and, as a result, disrupt growth cycle of mite population.	Spring and summer. Brood interruption can reduce honey production. This method is not recommended in late summer or autumn, as colonies need to build winter bees to ensure overwintering success.
Requeening with hygienic, increased grooming, or Purdue ankle-biters stock	Hygienic bees detect and remove infested brood more readily than other stocks. Bees that are selected to perform increased grooming can remove more bees from adults than other stocks.	Spring or autumn.

Table 2. Risks associated with chemical treatments.

Synthetic Chemical Treatments	Leaves residue in honey?	Leaves residue in wax?	Negative impacts to bees?
Apivar®	Yes, low levels that dissipate in months	Yes, low levels that dissipate in months	Impaired queen reproduction and increased brood mortality reported.
Apistan®	Yes	Yes	Impaired queen reproduction, brood development, and drone survival documented.
CheckMite+®	Yes	Yes	Impaired queen reproduction and reduced drone sperm quality documented.
Apiguard®	Yes, but dissipate in weeks. No permanent residue.	Yes, but dissipate in weeks. No permanent residue.	Reduced queen laying, and increased brood and adult mortality has been documented. Risks are greater when used at too high temperatures.
Api Life Var®	Low residues within the range of safety. Taints the taste.	Yes, but dissipate in weeks. No permanent residue.	Can cause bearding, adult irritability, bee mortality. Risks are greater when used at too high temperatures.
Mite-Away Quick Strips®	No	No	Can cause queen loss, adult and brood mortality, bearding, and absconding if used at too high temperatures.
Oxalic Acid	No, but not registered for use with honey supers in NYS	No, but not registered for use with honey supers in NYS	Some initial adult kill, and some sublethal effects (increased grooming, decreased activity, reduced lifespan) have been documented.
Hop Guard II®	Yes, only in honey in brood chamber. Not in honey supers.	Yes, only in wax in brood chamber. Not in honey supers.	None reported yet. More research needed.

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