

Certified Naturally Grown Apiary Certification Standards

Certified Naturally Grown's apiculture standards are developed with the primary focus on the health of honey bees and the sustainability of beekeeping. We seek to define best practices for natural beekeeping with these priorities as guides, and with the secondary focus on the agricultural products of apiculture (honey, pollen, and propolis). These are the basic Certified Naturally Grown (CNG) standards for apiary management and honey. CNG's standards for beeswax, queens, nucleus colonies, and package bees will be published separately.

Within each subheading in the standards the criteria for certification are clearly established as either Required, Recommended, Permitted, or Prohibited practices. In addition, we have noted practices that are allowed, but discouraged. Definitions are found in Appendix I, and lists of Allowed and Prohibited Substances specific to beekeeping are found in Appendix II.

These standards do not provide guidance on any federal, state or local regulations concerning beekeeping, food production or labeling. Contact your local beekeepers association or your state Agriculture department to ensure you're adequately informed about pertinent regulations.

Basic Management and Honey Standards

CNG certified beekeepers are encouraged to engage in safe beekeeping practices at all times, obtaining training and utilizing assistance when needed, wearing appropriate protective clothing, operating their smoker in a safe manner, using common sense and good judgment, and keeping their equipment clean and in good working order. They are to make regular hive inspections and maintain strong, gentle, queenright colonies.

- 1. Apiary Location.** Honey bees typically forage within a radius of 3 miles from the hive, though they'll travel farther if they have to, and less if they don't. There is no way to control their flight patterns.
 - Required – The land on which the hives are located must meet all CNG guidelines for produce. Both crops and land must be free of synthetic fertilizers, pesticides, herbicides and fungicides, as well as genetically engineered crops. Apiaries are to contain only as many bee hives as can be supported by the nectar and pollen supply in the local environment. All hives in residential areas are to be maintained with neighbor's interests and local ordinances accounted for.
 - Recommended – Locate hives on a CNG or Organic farm, and/or in remote areas away from conventional farm operations and other potential sources of contamination. Encourage neighbors to avoid the use of pesticides (particularly in particulate or dust form) all together, or if they must, to avoid their use during foraging hours (application near dusk is preferred) and follow labels for all pesticide use. Six or fewer hives in a suburban area (residential lots less than one acre each). Actively plant bee forage.
 - Permitted – Location of a CNG apiary within three miles of a conventional farm. Urban beekeeping.
 - Prohibited – Overcrowded apiaries. The use of any National Organic Program (NOP) or CNG prohibited substance on the land, including those for the purpose of weed control in residential areas. The commingling of apiary products (honey, pollen, propolis, beeswax), colonies, or hive components (frames, comb, brood chambers, etc.) between CNG apiaries and the apiary products, colonies, or hive components of conventional apiaries.

2. Hive Position.

- Required – Hives must be on stands at least 6" off the ground and exposed to at least four hours of direct sunlight per day.
- Recommended – Hives that are 16" off the ground and exposed to direct sun for the majority of the day. Hive stands that are perfectly level side-to-side (for no-foundation frames and stability with honey supers), and either level front-to-back or with a slight tilt forward (for rain water runoff with solid bottom boards). Face hives South or East and offer some wind protection or wind break. Have or provide a clean water source within ½ mile.
- Permitted – Hives facing North or West. Hives located in low lying or damp conditions are strongly discouraged, but allowed.
- Prohibited – Hives on low palettes, except when engaged in pollination services [13.] for up to 6 weeks.

3. Hive Construction. This section pertains to the bottom board, brood chambers, honey supers, inner cover, top and other feeders, queen excluders, and top, all of which are sometimes designated woodenware.

- Required – Hives must have removable frames, and adequate year-round ventilation (such as ventilation blocks or screened inner cover). Langstroth hives must have separate chambers for brood and honey. All woodenware obtained as used equipment must be thoroughly scraped and/or scorched, or irradiated or ethylene oxide-fumigated to ensure it is clean and free of disease.
- Recommended – New hives that are made of wood and metal, painted or stained on the outside surfaces only. Screened bottom boards on full size Langstroth hives, left open throughout the spring, summer and fall. The use of an occluding board under screened bottom boards is recommended during cold winters in northern climates from the resumption of brood rearing until warmer spring weather returns.
- Permitted – Top bar hives. Plastic hive components are discouraged, but permitted as long as the material is not fragile, such as foam plastics which may break down and leave residues inside the hive, or any plastic which has been treated on the interior surface of the hive. Used woodenware (bottom board, brood chambers and honey supers, top, feeders, etc.) that is empty of frames [4.] and free of disease (particularly AFB spores [14. (c)]), provided they have been thoroughly scraped, and/or scorched, or irradiated or ethylene oxide-fumigated. The painting of the inside surfaces of the hive with a mixture of propolis and alcohol. Minor use of fiberglass (such as a single component in a top feeder). Metal queen excluders. Solid bottom boards. Insulated hive wraps.
- Prohibited – Any chemical treatment (such as a wood preservative or pressure-treated wood) or paint on the interior of the hive other than propolis. Hives with poor ventilation.

4. Frames, Foundation, and Comb Removal in Brood Chambers. Most chemical residues are lipid soluble, and therefore accumulate in beeswax more than honey (which is water soluble). The commercially available beeswax used in foundation, whether plain wax sheets or wax-coated plastic, typically contains pesticide residues from the original source – both pesticides that have been used in bee hives *and* those used on crops that the source honey bees foraged on. Over time, pesticide residues accumulate, and have harmful effects on developing bee brood that is also reared in the wax cells [see FAQs]. Also, each pupa that develops in a cell leaves behind a very thin pupal skin (its cocoon) and as these continue to build, the cells get smaller and may become more susceptible to some brood diseases. Thus, regular removal of comb from brood chamber frames is required by CNG to minimize this chemical exposure.

- Required – At least 20% of brood frame comb must be removed from service per year (2 of every 8 or 10 frames per brood chamber per year or a similar schedule) on a scheduled basis, such that there is never brood comb present that is more than 5 years old. All brood frames must be marked to ensure this. Brood comb removal may be accomplished by cutting out the wax or scraping it off of plastic foundation and thereby saving the frame itself. Any brood comb that has been exposed to any CNG Beekeeping Prohibited Substances [Appendix II] must be replaced according to the Hive Transition Schedule [15. and Appendix V].
- Recommended – Wooden frames. Wax foundation made only from pure capping wax [9.] from a CNG hive using local wax processing or no-foundation frames [Appendix I]. Drone-Sized cells as approximately 10 – 20% of the total (either using 10 – 20% total frames from drone foundation or adequate no-foundation frames).
- Permitted – Frames previously used in honey supers may be used as brood frames. Used frames, as long as the brood comb has been removed and either had new foundation installed or employed as no-foundation frames. Used brood comb, from a nuc or empty used brood comb from another CNG beekeeper wherein that comb has never been infected with AFB and it has not been exposed to prohibited substances. All nuc brood comb and empty used brood comb from another CNG beekeeper must be marked and removed within two years [Appendix V]. The following are all permitted but discouraged: Plastic frames, commercially produced wax (wire-reinforced or thin) foundation, commercially produced wax-coated plastic foundation, plastic comb substitutes (Permacomb).
- Prohibited – Brood comb that has been exposed to ANY open in-hive treatments with coumaphos (CheckMite+) or fenpyroximate (Hivastan), or has been exposed to > 6 indirect exposures of coumaphos (CheckMite+), hydramethylnon or fipronil (Max Force Gel roach bait) as closed trapping for SHBs. Any empty brood comb that has been purchased used or obtained from any non-CNG beekeeper, other than obtained as a nuc. The commingling of brood frames, comb, and brood chambers between CNG apiaries and conventional apiaries.

5. Frames and Foundation in Honey Supers. [See 4.]

- Recommended – Wooden frames. Wax free plastic foundation with no coating or subsequently coated by the beekeeper solely with their own pure cappings wax [A.9.] using local wax processing [Appendix I], CNG beeswax, or wire-reinforced no-foundation frames.
- Permitted – Frames previously used in brood chambers, as long as there has been no history of exposure to any CNG Beekeeping Prohibited Substance [Appendix II]. Bee-o-Pac, Ross Rounds, and other prepackaged honey storage units. The following are all permitted but discouraged: Plastic frames. Commercially produced wire-reinforced wax foundation. Commercially produced wax-coated plastic foundation. Plastic comb substitutes (Permacomb, Honey Super Cell).
- Prohibited – Any frames that have been exposed to any CNG Beekeeping Prohibited Substance [Appendix II], while on any hive or in storage.

6. Queen and Bee Sources. Queens may be introduced to established colonies (requeening) or bees may be purchased as packages or nucleus colonies (nucs). CNG beekeepers actively support the breeding and selection of bees for natural tolerance of or resistance to diseases and pests by selecting for their own survivor colonies and also by incorporating feral survivor colonies into their operation.

- Required – If Africanized bees are suspected, appropriate state or federal regulations shall be followed, particularly in regards to swarm retrieval in Africanized areas.

- Recommended – The use of breeds that demonstrate Varroa sensitive hygienic (VSH) behavior and/or suppressed mite reproduction (SMR), Minnesota Hygienic, Russian, and/or survivor queens. Diversify and strengthen the apiary's gene pool by incorporating feral survivor colonies and through queen selection. The marking of the queen's thorax for easy identification. Queens from very aggressive colonies should be destroyed and replaced.
- Permitted – A single source or race of queens and bees. Unmarked queens. Used hives with bees, as long as all of the following conditions are met: a) No previous open-hive exposures to coumaphos (CheckMite+) or fenpyroximate (Hivastan), or > 6 indirect exposures of coumaphos (CheckMite+), hydramethylnon or fipronil (Max Force Gel roach bait) as closed trapping for SHBs; b) All Requirements in Hive Construction [3.] are met; and c) At least 60% of the comb has been replaced prior to being CNG Certified with removal and replacement of the remaining (< 40% of) comb within the first two years after certification [Transition Schedule 4, Appendix V]. The use of entrance queen excluders in Africanized areas.
- Prohibited – Queens that have been shipped in a cage containing a 1% fluvalinate (Apistan) strip. The clipping of a queen's wings (except breeder queens). Beekeeping operations in which colonies are killed in the fall and replaced the following spring with purchased packages or nucs. The commingling and incorporation of used hives with bees that do not meet the above Permitted criteria or bees or colonies from conventional apiaries into CNG apiaries.

7. Supplemental Feeding. Honey bee colonies may require supplemental feeding of sugar and/or protein during a prolonged nectar and/or pollen dearth, particularly during the fall in order to ensure appropriate stores for over-winter survival. They may also need supplemental feeding to transition from winter to spring before natural food is available.

- Required – If used, pollen patties must be stored frozen (deep freezer preferred) and thawed just before feeding.
- Recommended – Feeding enough refined white, granulated cane sugar syrup to ensure appropriate stores in the brood chambers for over-winter survival, only after honey supers have been removed or > 2 weeks before honey super addition. Sugar syrup should be fed to the colony within a few days of preparation and consumed within one week to prevent spoilage. Feeding pure pollen patties or an approved pollen substitute to promote brood production during broodnest expansions (typically fall and occasionally spring – particularly if pollen foraging is inadequate). Use of irradiated pollen for feeding, to prevent transmission of AFB spores.
- Permitted – Irradiated commercial pollen patties and non-irradiated commercial pollen substitutes and home-made pollen patties (that contain only the CNG beekeeper's collected pollen, water, and white cane sugar) are allowed provided there's not adequate pollen or bee bread in the brood chamber to ensure the colony's survival or appropriate broodnest expansion. Use of non-irradiated pollen, as long as it is only collected from the beekeeper's own CNG hives and processed in a timely manner. Dry sugar candy or fondant (typically 85% sugar, 10% sterilized honey, 5% water). Honey, from your own operation only.
- Prohibited – The feeding of sugar syrup within 2 weeks of the addition of honey supers or while honey supers are on the hive. Brown sugar, confectioner's sugar, sugar produced from GMO beets. High Fructose Corn Syrup (HFCS) [see FAQs]. Purchased liquid sucrose or sugar syrup which contains any additives or stabilizers. The feeding of sugar syrup that contains any CNG Beekeeping Prohibited Substance [Appendix II]. The feeding of home-made pollen substitutes that contain additional ingredients such as whey protein, soy products, Brewer's yeast, milk products, HFCS, vegetable oil [see FAQs], or any CNG Beekeeping

Prohibited Substance [Appendix II]. The feeding of any commercial pollen patty that has not been irradiated.

- 8. Honey Removal, Processing, and Labeling.** CNG Honey may be sold in five forms: extracted (both screen filtered and unfiltered or raw), chunk, comb, or creamed [Appendix I]. Any temporary flavor additives to extracted honey (such as herbs that are subsequently removed) must also be CNG certified or certified USDA Organic. Any permanent additives to creamed honey (such as freeze dried fruit or spices) must also be CNG certified or certified USDA Organic.
- **Required** – The honey processing and packaging operation (honey house) must be local and available for inspection. If an extraction service is used, a contract between the CNG beekeeper and the extraction service must stipulate the following: All extraction equipment must be thoroughly cleaned with water prior to the processing of CNG beekeeper honey frames, and that (as with processing done by the CNG beekeeper): Surfaces in contact with honey must be stainless steel, glass, wood, polyurethane, or food grade plastic. Honey labeled as pure must have had no additives at any time during processing. Honey labeled with a particular variety (i.e. 'Clover,' 'Buckwheat,' etc.) must have been derived of at least 51% from the labeled nectar source; otherwise it is to be labeled 'Wildflower' or carry no variety designation. Beekeeping operations using the CNG label must meet all Basic Honey Bee Management Standards, and must be certified by CNG. All CNG honey must also meet any standards set by the State in which it is produced and marketed. Only honey that is certified by CNG may be labeled as such.
 - **Recommended** – Leaving enough honey on the hive to allow for successful overwintering without supplemental feeding (amount depends on location). The use of escape boards, blowers, and bee brushes to remove honey supers from the hive. Minimal storage time of honey supers prior to extraction. Minimal processing with the goal of retaining enzymes and pollen particles characteristic of honey in sealed comb. The use of a low humidity environment for any honey super storage prior to extraction. The use of strainers to remove unwanted bee parts, wax and propolis from extracted honey. The use of water only to clean extraction and bottling equipment. Minimal lubrication of extractor moving parts with food grade lubricant only.
 - **Permitted** – The use of fume boards to remove honey supers provided the substance used as a fumigant is not CNG Prohibited [Appendix II]. The use of chlorine (dilute bleach) to clean extraction and bottling equipment is permitted but discouraged.
 - **Prohibited** – Overaggressive honey removal that leads to the need for excessive feeding of sugar afterwards. Any removal of honey from the brood chambers or frames thereof. The use of CNG Prohibited substances [Appendix II] on fume boards to remove honey supers from the hive. Ultra-Filtration or any process of filtration under pressure designed to remove chemical contaminants and/or pollen grains from honey. Honey that has fermented or that has a moisture content > 18.6%, unless it has been heated to kill yeast. The use of any substance that is not a CNG Beekeeping Allowed Substance [Appendix II] to clean extraction and bottling equipment. The commingling of honey from a CNG certified apiary [1.] and any that have not been certified. The addition of any sweetener or other altering agent (other than a CNG certified or certified USDA Organic flavoring agent such as an herb) to honey. The use of the CNG label may not be used in conjunction with any other label that is misleading or misrepresentative.
- 9. Wax Processing.** These standards govern the processing of wax to be re-used in a CNG apiary, but are not the standards to market or sell beeswax as Certified

Naturally Grown. CNG's Beeswax Standards will be published separately. Most beeswax contains some lipid-soluble chemicals and pesticides due to the nature of honey bee forage behavior [4.]. CNG aims to decrease the contamination of beeswax used in CNG apiaries to the lowest possible levels without placing unduly high barriers to participation in the CNG program. Typically most of the bottom of wax honey comb cell bases are drawn up from the wax already present on foundation, be it wax-coated plastic or wire-reinforced wax foundation. The upper portion of the cells is manufactured from wax produced by the bees themselves [Mangum, Reference 6.]. Also, honey supers are only present on the hive during a short portion of the season, and honey-laden cells are recapped by bees with fresh wax during the curing of each honey crop. Thus the strategy behind CNG wax processing is to limit the source of reusable beeswax to solely that from the honey super cell cappings. These cappings are at the upper 10% of the cell, are removed during each honey extraction process, and have been shown to contain only extremely low levels of pesticides.

- Required – Wax to be re-used in a CNG hive must be obtained solely from honey super cappings from a CNG hive. Impurities must be removed by a suitable rendering process, in which only non-fragile lipid-inert materials are used (stainless steel, glass, wood, and synthetic substances that will not break down and leave residues in the wax).
- Recommended – The removal of water-soluble impurities by first washing the cappings (contained in a mesh bag) multiple times in very warm water and drying it. Directly (stove) or indirectly (solar wax melter) heating the impure wax, and straining the molten wax to remove solid impurities (bee parts, propolis).
- Permitted – The use of synthetic mesh for straining, as long as the synthetic material is stable at a temperature of 250 °F (the melting temperature of beeswax is 145 °F).
- Prohibited – Wax obtained from any in-hive source other than honey super cappings. Copper or iron wax-rendering containers. The use of any substance that is not a CNG Beekeeping Allowed Substance [Appendix II] to clean wax processing equipment. The commingling of wax from a CNG certified apiary [1.] and any that have not been certified. The addition of any altering agent to wax.

10. Other Products of the Hive. Since pollen collected by foraging bees is needed for healthy bee nutrition and brood development by the colony [see FAQs], and propolis possesses natural antibiotic properties that are very beneficial to honey bee colonies the removal of either of these products from bee hives must be done in moderation, with great care to prevent harm to the hive.

- Required – Any pollen removed must be purified by removing bee parts, etc. and processed according to CNG Certification Standards even if it is to be used for supplemental feeding later in the season [7.].
- Recommended – Minimal removal of propolis from hive components (only enough to allow easy removal of frames and separate chambers).
- Permitted – The removal of propolis, using propolis traps in the spring and summer is allowed only if the hive is healthy and only if adequate propolis buildup is allowed between collections, typically no more often than once per month. The removal of pollen, using hive entrance traps is allowed under these conditions: a) the pollen trap is in place no longer than one week at a time, and no more often than every three weeks, and, b) the colony has adequate bee bread stores (one entire side of one frame for every 8 frames of brood) ensured before each employment of the trap.
- Prohibited – Harvesting of pollen or propolis from weak or struggling hives. The use of any substance that is not a CNG Beekeeping Allowed Substance [Appendix

II] during sterilizing, repackaging, or preserving of pollen collected for the purpose of supplemental feeding to bee colonies [8.].

11.Hive and Frame Storage and Transfer between Colonies.

- Required – Removal of all equipment (brood chambers and frames) housing dead colonies or dead outs from the apiary in a timely manner (except in late winter/early spring, see Permitted). Dead outs are defined in Appendix I. Suspicions of serious disease such as AFB [14. (c)] warrant immediate attention by appropriate state or federal bee inspectors or other local experts, if they are unavailable in your area. Destruction of frames containing a lot of dead brood.
- Recommended – Place only the number of chambers on a hive that the colony can adequately patrol (for pests). Reduce hive size in small colonies so that they can better manage temperature and humidity. Transfer frames containing pollen or bee bread and/or small amounts of uninfected dead brood to a healthy colony and store such frames in a freezer until they can be transferred [see Appendix I]. Only store dry honey frames and supers that have not been used as brood frames and contain very little pollen off of hives. Freeze frames to kill wax moth or SHB larva/eggs prior to storage or transferring to a healthy hive.
- Permitted – The transfer of frames containing bees between colonies in the CNG operation. Empty brood comb storage off of hives is discouraged but permitted. Uninfected empty brood comb or comb only containing honey is preferably transferred to a healthy colony, but may be stored off of a hive. If empty brood comb must be stored, it is suggested that the frames are exposed to fresh air and sunlight. Comb containing small amounts of dead brood with no signs of AFB [14. (c)] may be temporarily stored off of hives in a freezer until they can be transferred to a healthy hive. Keeping hives containing over-winter colony deaths (where the dead bees have been removed) in the apiary during times of continued winter cold until spring arrives.
- Prohibited – The exposure of any comb to chlorine (bleach), or any other substance (such as PDB) except CNG Beekeeping Allowed Substances [Appendix II], while being stored outside a hive. The storage of large amounts of live or dead brood outside a hive, except when performing drone brood removal [Appendix I] for Varroa mite control [14. (a)]. The transfer of frames containing a lot of dead brood between colonies. The commingling of any frames from CNG apiaries and conventional apiaries unless they are clearly marked and documented in the hive transition schedule [15.].

12.Moving Colonies. Anytime a hive or colony of honey bees is picked up and moved to another apiary (not within an apiary) CNG considers that a single move. The movement of honey bee colonies is sometimes necessary between apiaries, such as for the engagement of pollination services [13.] or to an apiary with better natural forage during a pollen and/or nectar dearth. Movement is stressful on colony health, however. CNG sets standards regarding colony movement in order to limit that stressor. These standards do not apply to observation hives that are used for education.

- Required – All apiary destinations must conform to Apiary Location and Hive Position standards [1. and 2.]. All colonies must be provided with excellent ventilation during the entire moving process.
- Recommended – No or minimal colony movement (only as necessary for the colony's well-being). Hives to be moved should be prepared by securing all the foragers inside at either dawn or dusk, and moving the hive during temperate weather.
- Permitted – Up to four moves, between up to three approved apiaries [1.] per colony per calendar year. In other words, at a maximum a given hive may be moved from Apiary X to Apiary Y to Apiary Z and back to X within one calendar

year. Unplanned moves due to emergencies such as bear attacks or uninhabitable conditions such as those caused by floods or hurricanes would not count against the four move maximum.

- Prohibited – Moving any colony more than four times (other than emergencies) during any calendar year. Moving any colony to any uncertified apiary at any time.

13. Colonies Engaged in Pollination Services. In order to utilize bees for pollination services, the land *and* produce must adhere to CNG standards for the entire time the bee hives are present on that land and for at least three months prior to the arrival of the bees.

- Required – A contract between the beekeeper and crop producer specifying that for the entire time the land is occupied by the bee colonies, and the three months prior to their arrival, all crops on the land managed by the producer will meet all CNG guidelines for produce, and no prohibited substances will be used on the land, crops, or bee colonies. A clean source of water for the bees must be provided within ½ mile of the hives.
- Recommended – When seeking or selecting clients for pollination contracts, priority should be given to producers who demonstrate a commitment to organic practices, whether Certified Naturally Grown, Certified Organic, or someone whose practices you know and trust. Encourage producers of neighboring property to avoid the use of pesticides (particularly those in particulate or dust form on windy days) completely, or if they must, to avoid their use during foraging hours (have them wait until near dusk).
- Permitted – Hives on palettes, but only for 6 weeks, and only during the pollination contract.
- Prohibited – More than three pollination contracts per year. The use of any CNG prohibited substance or the use of any CNG Beekeeping Prohibited Substance [Appendix II] on the land or bee colonies for the entire time the land is occupied by the bee colonies and for the three months prior to their arrival.

14. Treatment of Specific Pests and Diseases. This section specifies requirements for the monitoring of and recommendations for the non-toxic treatment of specific honey bee diseases and pests. Common beekeeping practices for each disease and pest, both chemical (typically prohibited) and biological and cultural (typically permitted) are specified for clarification purposes. Guides of how to implement the recommended and permitted treatments are not included. The References [Appendix III] may be used as guides for these implementations, but are not recommendations of CNG. All treatments must be carried out in accordance with labels, good practices, and within CNG Standards. The treatments listed as Specifically Prohibited in this section are included only because they may have been recommended and/or used by other beekeepers in the past. In the treatment of all of the below and any other honey bee diseases, the CNG Beekeeping Allowed and Prohibited Substances lists [Appendix II] always apply.

(a) Varroa Mite. Varroa mites are a very serious threat to honey bees and are now ubiquitous (present in every colony) and widespread throughout the world. They cannot be eradicated. Varroa mites vector numerous viral diseases, the most obvious of which is Deformed Wing Virus, or DWV [14. (g)]. Treatment for Varroa mites is very problematic, because 2/3 of their life cycle occurs underneath the capped cells of developing bee pupae. Many Varroa mite populations have also developed resistance to many of the chemical miticides used against them. Since European honey bees are not the original host of this parasite, a biological equilibrium between the two species has not been reached. Treatment of infested colonies only leads to the selection of virulent

mites and inhibits the selection of honey bee resistance traits. Bees carrying hygienic traits (Minnesota Hygienic and VSH or Varroa Sensitive Hygienic) and Russian bees have some tolerance already. Therefore all chemical treatments for Varroa mites are strongly discouraged. A number of cultural controls have been developed, and their uses are either required or permitted.

- Required – All hives must be exposed to at least 4 hours of sunlight per day, and have adequate ventilation. If you wish to treat for Varroa mites, the treated hives must be monitored at least once a year (typically just after the last honey harvest and before the last few brood cycles of the fall broodnest expansion), and after every chemical treatment, by using a sugar shake test [Appendix I], or some other appropriate test. Adequate records of both infestation levels and treatments must be kept [16.] on all treated hives.
- Recommended – The use of bees that demonstrate Varroa sensitive hygienic (VSH) behavior (previously termed suppressed mite reproduction or SMR), Minnesota Hygienic, Russian, and/or survivor queens. The use of some method of monitoring hygienic behavior. Monitoring for Varroa infestation levels with a sugar shake test and/or brood uncapping test when brood production is at a peak (typically late spring / early summer) and every six weeks thereafter in order to determine the mite peak in your area. More frequent monitoring if infestation levels are high. Maintaining careful records of infestation levels for all hives throughout the season as a means to determine your area's treatment threshold. Making splits of colonies (as a cultural method of Varroa control) is highly recommended but not required. Open screened bottom boards on all hives. Even if using an approved treatment (see Permitted below) on hives that are over the treatment threshold, treatment of only a small percentage of hives or no hives at all is strongly recommended because both classes of approved treatments (organic acids and essential oils) have been demonstrated to have deleterious effects on honey bees.
- Permitted – Dowda method of powdered sugar dusting and drone brood trapping [Appendix IV] may be performed on all hives, indiscriminately, at any time or repeatedly throughout the year. All other treatments must be based on monitored levels of infestation and used only if the mite population has reached a level that threatens the health of the hive. Treatment thresholds vary depending on location and should be determined by the beekeeper, in collaboration with others in his/her local network. Treatment thresholds are to be generally accepted within the beekeeper's geographic region. Use of the following organic acids: HopGuard, formic, oxalic, lactic, and acetic, or the use of thymol (ApiLife VAR, Apiguard) and other essential oils such as oil of clove, white thyme, wintergreen, lemon grass, etc. provided each hive is only treated once per calendar year, and provided the threshold level has been reached for each treated colony and documented. Formic acid may be used for one treatment per hive over treatment threshold per calendar year (maximum 21 days for MiteGone or Mite Away II pads, 7 days for Mite Away Quick Strips, 24 hours for a Formic Acid Fumigator [Amrine, Reference 10.]). Formic acid must be used in accordance with application instructions (including ambient temperature) and may not be used while honey supers are present on the hive or for longer than the above time limits despite application instructions. Other organic acids may be used for one treatment per hive over treatment threshold per calendar year wherein the acid exposure is as limited as possible (a single drizzle or fumigation). Thymol-based products (ApiLife VAR, Apiguard) and other essential oils may only be used after honey supers have been removed and for a maximum of 4 weeks per calendar year; any residual oils must be removed from the hive

after 4 weeks. Sucrose Octanoate ester (Sucroside) and Apiforme may be used at any time. Use of small cell foundation is permitted.

- Specifically Prohibited – Coumaphos (CheckMite+). Fluvalinate (Apistan, Mavrik). Amitraz (Miticur, TakTic, Mitac). Fenpyroximate (Hivastan). Fumigation with food grade mineral oil (FGMO). The treatment of every hive in the operation indiscriminately, or treatment of any hive without documentation of infestation level above treatment threshold (except Dowda method and drone brood removal), even if when using an approved treatment. Using any Allowed Substance as treatment for longer than or at a higher or lower dose than specified by the label of that product.

(b) Tracheal Mite. Tracheal mites are microscopic parasites of the honey bee trachea, causing some over-winter colony deaths. Populations peak in March/April. Severely infested bees may crawl around the entrance and display K-wings (also true of *Nosema* infestation [14. (e)]). Many honey bee populations have developed resistance to Tracheal mites, and therefore treatment for Tracheal mites is discouraged. To diagnose a severe infestation, crawling bees are collected from the hive entrance, stored in 70% ethanol, and dissected. Greater than 10 % of bees dissected and > 8 mites per infected trachea are confirmation of a severe colony infestation.

- Required – Prior to instituting treatment, a severe infestation must be confirmed, as above, and documented.
- Recommended – Breeding for Tracheal mite tolerance. The use of Carniolan, Russian, and Buckfast strains of bees, as they have the most tolerance.
- Permitted – Formic acid, essential oils, menthol, Organic vegetable oil, after the last honey harvest or at least 30 days prior to adding honey supers, in documented cases of severe infestation only, once per calendar year.
- Specifically Prohibited – Treating colonies that have not had a confirmed diagnosis of severe infestation. Use of the above Permitted substances when honey supers are on the hive or during the 30 days prior to honey super addition.

(c) American Foulbrood (AFB). AFB is a serious bacterial disease that infects developing larvae and pupae. AFB spores can exist in honey and brood comb for over 50 years, and the spore phase cannot be treated! Honey bee larvae are only susceptible to AFB spores for two days. Serious hive infections are characterized by a spotty brood pattern, associated with sunken and punctured pupal cappings, along with a foul odor, which is reminiscent of gangrene. Low-yield colonies that don't take supplemental feed should be suspected and monitored carefully. Diagnostic kits (VITA) and field tests (the ropiness test) can distinguish AFB from EFB. The prevalence of spore colonization in colonies of bees in the US is high, but the incidence of overwhelming infection is less than 2 %. Over ¼ of all AFB is now resistant to the primary antibiotic, oxytetracycline (Terramycin) due to overuse as a prophylactic agent. Because entire apiaries can quickly become contaminated from a single infected hive (robbing of a dead out most commonly), prevention, early recognition, and effective treatment of AFB is critical.

- Required – Good sanitary beekeeping practices, timely removal and inspection of dead colonies or dead outs, and regular brood comb replacement [4.] for prevention. Immediately contact a state bee inspector or other local expert upon any suspicion of infection. In cases of serious infection, burn all infected brood combs and frames as soon as possible. Keep all infected hive components sealed until destruction or cleaning.
- Recommended – Avoid used woodenware [3.]. Kill infected bees with soapy water and burn all unusable woodenware in all cases of infection.

- Permitted –The incorporation of used woodenware (not brood comb!), from a known source that has never had a serious AFB infection, into the operation as long as it has been prepared by thorough scorching and/or scraping of all interior surfaces with a stiff pad and soapy water or dilute bleach (1:9) or it has been irradiated or fumigated with ethylene oxide. The use of irradiated or ethylene oxide-fumigated empty drawn comb from a previously AFB-infected colony. The shaking of AFB-infected adult bees (from a colony without an overwhelming infection) onto foundation or clean drawn comb is permitted, but is not a recommendation of CNG.
- Specifically Prohibited – Oxytetracycline (Terramycin) for either prophylaxis or treatment. Tylosin (Tylan), for either prophylaxis or treatment. The incorporation of used frames containing someone else's empty brood comb into the operation. The reincorporation or transfer of AFB-infected frames between hives. Supplemental feeding [7.] with someone else's honey or someone else's non-irradiated pollen.

(d) European Foulbrood (EFB). EFB is a disease that infects developing larvae and is caused by a non-spore forming bacteria. It is most common during the spring broodnest expansion, and is usually self-limited (by an improved nectar flow). Although a foul odor may be present (similar to AFB), sunken and punctured pupal cappings are typically not found, as this disease primarily affects larvae (which can be discolored and twisted in their cells). Diagnostic kits (VITA) and field tests (the ropiness test) can distinguish EFB from AFB. Resistant strains of honey bees are common.

- Required – Distinguish suspected cases from AFB [14. (c)].
- Recommended – Supplemental feeding. Requeening, if the infection persists. Well-ventilated, dry, sunny hive positions.
- Specifically Prohibited – Oxytetracycline (Terramycin), for either prophylaxis or treatment. Tylosin (Tylan), for either prophylaxis or treatment.

(e) Nosema. *Nosema apis* and *Nosema ceranae* are spore-forming microsporidia that infect the midguts of honey bees with a high prevalence. Colony collapse disorder (CCD) has been associated with Nosema. Although defecation inside the hive can occur, more commonly severely infested bees may crawl around the entrance and display K-wings. The two Nosema species have different effects on bees and different peaks during the season. Analysis of bee's midguts is required to distinguish Nosema from Tracheal mites [14. (b)] and determine the level of infection. There may be an association between Nosema and Black Queen Cell Virus [14. (g)].

- Required – Good sanitary beekeeping practices for prevention.
- Recommended – Minimal squishing of bees during hive inspections and manipulations. Appropriate supplemental feeding, particularly of pollen or pollen substitutes during the fall. Well-ventilated, dry, sunny hive positions. Nozevit, as a sugar syrup supplement or as incorporated into pollen patty which otherwise meets CNG standards [modification of Gajger et al, Reference 9.].
- Permitted – Apiforme, Api Herb, apple cider vinegar, Bee Tea, essential oils, Honey B Healthy, lecithin, Pro Health, resveratrol, Vitafeed Gold, or any other substance on the List of CNG Allowed Substances that may be useful as natural alternative treatments for Nosema [Appendix II].
- Specifically Prohibited – Fumagillin (Fumidil-B), for either prophylaxis or treatment.

(f) Chalkbrood. Chalkbrood is a spore-forming fungus, typified by chalky white mummified larva found at the hive entrance in the spring. It only rarely destroys a colony.

- Recommended – Supplemental feeding. Move infected hives into a sunnier location, and if the infection persists, requeen.
- Specifically Prohibited – Locating infected hives in low lying, damp, or shady locations [2.].

(g) Viral Diseases. There are many viral bee diseases and none can be treated.

Viral diseases are more prevalent in stressed colonies and many (Deformed Wing Virus, or DWV) are vectored by Varroa mites. DWV is characterized by bees with curled up wings and shortened abdomens. Colony collapse disorder (CCD) has been associated with Israeli Acute Paralysis virus (IAPV), Invertebrate Iridescent Virus and similar viruses. Black Queen Cell Virus causes a dead black pupal scale within a capped queen cell and may be associated with Nosema. Sacbrood Virus may cause dark punctured pupal cappings, similar to AFB, but is much less widespread, and lacks the characteristic odor of AFB. It, like EFB, is most common in the spring and in colonies exposed to excess moisture and cool temperatures. Dead larvae from sacbrood are contained in a sac, and can be removed from their cells intact, unlike AFB.

- Required – Distinguish suspected cases of Sacbrood virus from AFB [14. (c)].
- Specifically Prohibited – Locating infected hives in low lying, damp, or shady locations [2.]. More than four moves per colony per year [12.]

(h) Wax Moths. Greater and Lesser Wax Moth females lay eggs en-mass on or close to wax which contains pollen (brood comb), both on bee hives and on stored comb. Eggs hatch in 3 – 5 days, and larvae destroy brood comb by tunneling at the base of cells containing pollen and honey bee pupal skins. During pupation, their cocoons cause minor damage to woodenware. Freezing kills all stages of Wax Moths.

- Recommended – Utilize sunlight exposure in stored honey supers to prevent comb damage by Wax Moths and avoid indoor storage until appropriately cold ambient temperatures (< 50° F) are reached. Avoid the storage of any comb containing pollen off of a hive to prevent wax moth damage. If it must be stored off of a hive, store brood comb in fresh air, exposed to sunlight. Cut out any damaged sections of stored comb, freeze the frame for 24 hours, and place it into a strong colony for repair.
- Permitted – Trapping adult moths with an external trap [Appendix I]. The use of B401 or Certan or XenTari organic biological insecticide spray, Bacillus thuringiensis var. aizawai (Bta) which kills Lepidoptera larvae (Valent) to prevent comb damage by Wax Moth larvae is allowed, but discouraged. Stacking damaged comb over fire ant nests will allow the fire ants to clean up the comb and kill any wax moth larvae, but be careful!
- Specifically Prohibited – Paradichlorobenzene (PDB) crystal fumigation of stored comb. Aluminum phosphide (Phostoxin) fumigation. Moth ball or naphthalene fumigation.

(i) Small Hive Beetle (SHB). SHBs are typically opportunistic predators that don't cause the demise of strong colonies; they are more problematic in the Deep South in areas of sandy soil. SHB females lay eggs en-mass on or near pollen. Eggs can hatch within one day. The larvae (5 – 14 days) damage comb while feeding on pollen and damage honey by carrying a yeast that causes its fermentation. The yeast is very repellant to bees and may lead to absconding. Larvae then travel on the ground and pupate in the soil. Adult

SHB colonies may over-winter in the forest or inside bee colonies. SHBs are attracted to weak, stressed bee colonies and pollen in stored comb. Treatment thresholds have not been established, but fewer than 100 adult beetles per hive (that have not begun reproduction) are probably safe. Hygienic bees are good at finding egg masses and removing them.

- Required – Regular hive inspections. Maintenance of strong, queenright colonies. Removal of all equipment (brood chambers and frames) housing any dead colonies or 'dead outs' from the apiary in a timely manner.
- Recommended – Avoid providing more chambers than the colony can patrol. Avoid discarding burr comb in the apiary (collect it instead). Avoid providing more pollen than the colony can consume within 5 days during supplemental feeding [7.]. Minimal storage time of honey supers (< 3 days) prior to extraction. The use of a low humidity environment for any honey super storage prior to extraction. Timely processing of wax [9.]. Avoid storage of left over products of extraction ('slum gum'). Allow bees to clean and dry out wet extracted honey supers from their own hives. Freeze infested frames to kill SHB larvae and eggs and if the damaged area is small, remove the SHB nest, wash the frame vigorously with sprayed water, and return it to a strong colony to repair. Discard moderate and heavily damaged comb.
- Permitted – In-Hive beetle traps (Freeman, Hood, West, Beetle Jail, AJ's beetle eater, Cutt's better beetle blaster, etc), containing food-grade mineral oil (FGMO), USDA Organic vegetable oil or apple cider vinegar. Diatomaceous earth in Freeman traps. In-Hive traps containing a mixture of ground-up crickets and boric acid, as long as bees are prevented from direct exposure by a small entrance size to the interior of the trap. External beetle traps [Appendix I]. Heat lamp, sand, and water traps in honey house extraction areas. Nematode soil treatment with *Heterorhabditis indica*.
- Specifically Prohibited – Coumaphos (CheckMite+) and Hydramethylnon or Fipronil (Max Force Gel roach bait), even when bees are prevented from direct exposure (such as with various traps). Permethrin (Guardstar) yard drench.

(j) Other Insects. Ants (including Fire Ants), European Hornets, and Yellow Jackets are typically opportunistic predators that cause little damage to strong colonies.

- Recommended – Maintain colony strength and avoid the 'storage' of any more chambers on the hive than what the bee colony can patrol.
- Permitted – The following hive stand leg modifications may help control ants: place the legs in a shallow pan of water, place the legs on coffee grounds, spread a combination of grease, ground cinnamon and/or garlic powder circumferentially around the legs.
- Specifically Prohibited – Pesticides (insecticides kill bees).

(k) Mice. Mice can destroy comb during winter months and may inhabit honey houses.

- Recommended – Use the smallest entrance possible during the fall and winter to prevent entry into the hive. Chase them away, replace any damaged comb and frames, and wash any urine from the interior surfaces of woodenware with water only.
- Permitted – Mouse traps or non-synthetic mouse repellants in honey houses.
- Specifically Prohibited – Mouse poisons in honey houses. Mouse traps or repellants in bee hives.

(l) Skunks, Possums, Raccoons. These animals feed on bees at night by scratching at hive entrances to get bees to come out. This causes bee

colonies to become more defensive. Animal scat containing bees and bee parts can sometimes be seen in front of affected hives.

- Recommended – Move pestered hives that have become aggressive to another approved location [1.]. Keep hives at risk on stands at least 16" off the ground.
- Permitted – The use of carpet tacking placed on the hive entrance so that the tacks face up and toward the hive entrance. Chicken wire around bee hives. Upper hive entrances.

(m) Bears. Bears destroy hives in search of brood and adult bees, which they eat.

- Recommended – Selection of apiary sites away from known bear habitat, or if in a known habitat, away from streams and ridges. Place at-risk apiaries near a dog. Use of 2 straps per hive to deter bears.
- Permitted – The installation of an electric bear fence. Critter getter type alarms.
- Specifically Prohibited – Shooting bears. Poisoning bears.

15. Hive Transition. Beekeepers who wish to transition their operation to meet CNG Standards are encouraged to do so. All hives within the apiary must transition to the CNG program (no "split" operations). The hive transition subject addresses issues specific to previous land and wax or comb exposure to CNG Beekeeping Specific Prohibited Substances [Appendix II]. The requirements for hive transition are outlined in Appendix V.

- Required – All CNG Basic Management and Honey Standards must be followed. Records of previous wax exposure to prohibited substances and their removal must be clear. An immediate cessation of prohibited substance use.
- Recommended – An aggressive brood comb removal and replacement schedule (> 30 % per year is possible) until 60 % of old brood comb is removed and replaced.
- Permitted – The use of hives that have previously been in prohibited apiary locations [1.] or positions [2.], as long as they have been moved to approved locations and positions. The use of owned/operated land [1.] that previously failed to meet CNG Beekeeping standards, wherein all prohibited chemical use has been discontinued, including the use of GuardStar yard drench for control of SHB larvae [14. (i)]. For the above and previous exposure of brood comb to Prohibited Substances, refer to the standards in Appendix V: CNG Operation and Hive Transition Table. In all cases of brood frame transition from previous exposure to a Prohibited Substance, each frame will require marking at the beginning of the transition period, to ensure that all of the previously exposed comb is replaced within two years after CNG Certification.
- Prohibited – Any wax or comb that has EVER been exposed to open coumaphos (CheckMite+) or fenpyroximate (Hivastan), or has been exposed to > 6 indirect exposures of coumaphos (CheckMite+), hydramethylnon or fipronil (Max Force Gel roach bait) as closed trapping for SHBs (when used inside a SHB trap in which the bees had no direct exposure to the coumaphos or roach bait). The commingling of any hives, hive components, or products of the hive between hives that have not yet met the CNG certification requirements and the CNG Certified beekeeping operation.

16. Record Keeping.

- Required – For any treated hives, records of Varroa mite counts and treatment dates. All disease and treatment types and dates, hive locations and movement dates for all hives. Pollination contracts [13.]. Extraction service contracts [8.], if honey is extracted by anyone other than the CNG beekeeper. Records of brood

- frame marking both for the purpose of removal [4.] and transition [15.]. CNG inspection dates and notes on inspectors' key observations.
- Recommended – Records of each hive's queen race / breeder, mark, color, and introduction date. Supercedure and swarming dates. Dates and types of supplemental feeding. Varroa mite counts for all hives, including untreated ones, with notes on hive vitality, to help determine treatment thresholds. Honey production for all hives. A sample record (for a single hive) can be seen in Appendix IV; the sample hive record excel spreadsheet can also be downloaded from CNG.

Appendix I – Definitions and Technique Descriptions

- **Bee Tea** – A sugar water solution mixed with chamomile and dandelion root tea.
Download detailed recipe here: <http://honeybeelives.org/HoneybeeLivesBEE-TEA-08.pdf>
- **Bee Bread** – What appears as moist pollen at the edge of the broodnest. Dry pollen is collected from flowers and is processed en route by forager bees flying back to the hive and by house bees by the addition of nectar, enzymes, and microorganisms. The thus processed pollen that is stored in cells contains lactose fermenting bacteria, and fungi that predigest the (now) bee bread. Bee bread is what is essential to a healthy colony because it is directly fed to older developing larvae and it is also eaten by nurse bees so that they can produce brood food (royal and worker jelly) from their glands for the younger larvae to eat.
- **Brood Uncapping Test** – A very good, but labor intensive test that requires magnification, good lighting, very small forceps and a steady hand. In the summer, uncap 100 – 150 worker pupae. By the purple-eyed stage of bee pupal development, foundress Varroa mites will have reproduced if they're going to. Assess the absolute worker brood infestation level. If < 10 % of the uncapped cells contain Varroa mites that is good; < 5 % is excellent. Assess for mite reproduction on purple-eyed bee pupae by finding immature (white) mites along with their foundress mother. A mite reproduction rate < 67 % is good and < 50 % is excellent. If the brood area of the entire colony is estimated, the total colony mites in brood can be calculated (% brood infestation x # worker brood cells). When added to the total colony phoretic mites on a sugar shake test [below], the total colony infestation level can be calculated. Treatment threshold is > 3,600 total live mites in July/ August in the southeastern US.
- **Dead Out** – A colony in which the bees all died during the growth and production season (spring, summer, or fall). Possibly secondary to a serious brood disease, such as AFB. Dead outs allow other robbing bees to pick up and transmit brood diseases back to their colony and also allow pests such as wax moths and SHBs an ideal area to proliferate. Therefore dead outs require timely removal from the apiary to prevent disease and pest spread. Colonies that die over winter and are found in late winter / early spring are not dead outs and are typically not due to disease (other than to mites, which also die with the colony). Although the dead bees and uneaten pollen frames of over-winter deaths should be removed from the hive, the hive itself may be safely left in the apiary until the weather warms up.
- **Dowda Method of Powdered Sugar Dusting** – This may work better during broodless periods, but treatment may be too late once a broodless period has been reached in the fall. You need 10X powdered sugar (that does not contain corn starch), a measuring cup, a sifter (tea strainer or flour sifter), and a bee brush. The hive must have a screened bottom board (1/8" mesh). Insert a dry bottom board or piece of poster board below the screen. Separate the brood chambers and sift 1 cup of 10X powdered sugar over the brood frames of the lower chamber. Brush the sugar off the top bars down between the frames. Replace the upper brood chamber, sift another cup of powdered sugar and brush it down too. Wait at least 5 minutes, remove the bottom board and check for mites. Leave the bottom board out for ventilation. If you see a lot of mites, repeat this every few days.
- **Drone Brood Trapping / Removal** – Have bees draw comb on frames of drone cell foundation in the spring. If not already present, place one frame of drawn drone comb per brood chamber in positions 3 or 4 by early June. After 26 – 30 days, remove all drone frames, and replace them with alternates within 24 hours. Removed drone frames may be placed into a drone rearing, untreated 'sacrificial colony' or put into the freezer.

If placed into a queenright sacrificial colony, they may be removed and replaced into their original colony after the drones have emerged. If frozen, the frames should be kept in the freezer until they can be immediately placed back into their original colony. Warm them up just before returning them to the hive. DO NOT feed decayed brood back to your bees. It takes the bees a few days to clean out the dead cells and the queen a few more days to lay more unfertilized eggs. Rotated drone combs from the freezer to the hive every 26-30 days in the summer. Drones develop in 24 days. Hence the rotation period of 26 – 30 days. If the drone comb is filled with honey, do not remove it.

- **External Beetle and Wax Moth Trap** – a 2 liter drink bottle with a hole cut 1 1/4" below the neck shoulder. Fill with equal amounts (1/4 – 1 cup each) of vinegar, sugar, and water. Shake until the sugar is dissolved. Then add a very ripe thinly sliced unpeeled banana or slum gum or rotten orange and place it in a warm place to begin fermentation. Then hang it from a tree near the apiary or the stored supers.
- **Honey** – Honey is the unadulterated natural sweet substance that is produced when nectars from plants are gathered, modified, dehydrated and stored in honeycomb by honey bees. Honey is a pure product that does not allow for the addition of any other substances including, but not limited to, water or other sweeteners.
- **Hygienic Test** – Requires killing a large section of capped brood by freezing it with a 3" diameter tube containing liquid nitrogen or cutting a 3" x 3" section of brood comb out and freezing it and returning it after 24 – 48 hours or by using a bent pin and puncturing the sides of all six pupae surrounding the cell that is originally pricked across the same size area. Return 24 hours later and count the cells with dead pupae that have not been removed along with the number that were. See www.naturallygrown.org/hygienic for more information.
- **Local Wax Processing** – The source of the wax in commercially available foundation typically contains whatever chemicals the bees of the wax-supplier were exposed to. The bottom 1/2 of the wax honey comb cell bases are typically produced by the honey bees by drawing out the wax that is already present on the foundation, be it wax-coated plastic or wire-reinforced wax foundation. The upper 1/2 of the cells are typically made from wax produced by the bees themselves. Local processing allows only the cappings wax from the CNG Certified beekeeping operation to be melted and re-used. Local wax may be formed into new foundation by the use of a foundation roller or casting mold or may be painted onto bare plastic foundation.
- **No-Foundation Frames** – Frames in which all the wax comb, including the flat backbone, has been drawn by the bees without foundation. Sometimes a very narrow (< 3/4") strip of thin wax foundation is used at the top of the frame as a 'starter.' Other times a narrow strip of plastic foundation or just the groove in the top bar is used as a straight guide for the bees to follow. Supporting wires are commonly used on these frames to strengthen the comb and prevent sagging with time and tearing from the centrifugal force applied by honey extractors. It is suggested that the hive be perfectly level side-to-side and that no-foundation frames be placed in a checkerboard or staggered orientation (without too many right next to each other). Otherwise, the bees may draw the comb at an angle and tie one frame to another.
- **Sticky Board Test** – This easy test only examines dead mites and therefore a high drop count doesn't tell you whether your colony is severely infested or is hygienic and killing a lot of the mites that are present. Best done at the Varroa mite peak (typically after the last honey harvest and before the fall broodnest expansion (late July/August). Repeat test after any treatment. Perform more frequently if you do not know when the Varroa peak in your area. Cover uncoated insert board with cooking spray oil and/or

Vaseline (or use pre-coated boards). Insert the board in the slot under the screened bottom board of the hive. Remove it and count the Varroa mites 24 hours later. Mites are reddish brown, slightly oval, and are the width of the period at the end of this sentence. If there are greater than 100 mites / hive / 24 hours, treatment (with an Allowed Substance) may be indicated in the southeastern US but treatment thresholds may vary, depending on your locale.

- **Sugar Shake Test** – This samples and accounts for 70 – 90 % of the phoretic Varroa mites in the broodnest. Construct the top of the Mason jar with 1/8" mesh screen. 4 oz of (shaken down) bees in a Quart jar is about 150 bees. 1 1/2" of bees is about 8 oz or 300 bees. To perform the test (typically late summer): Gently gather 4 – 8 oz (150 – 300) nurse bees from an old larva area of broodnest in the Mason jar. Make sure you don't catch the queen! Add 1 – 2 tsp powdered sugar through the mesh lid. Roll the jar around for a minute or two and let it sit for 4 minutes. Shake the sugar out through the 1/8" mesh lid onto a plate with water in it. The sugar will dissolve and the mites will swim / float on top of the water so you can count them. Release the bees at the hive entrance. Potential treatment thresholds are > 10 mites / 100 bees or > 22 mites in an average (6 oz) sample in the southeastern US in the late summer, but may vary, depending on your locale. When adult bees are estimated, the total colony phoretic mites can be calculated (estimated adult bees x mites / 100 bees). When added to the total colony brood mites on a brood uncapping test [above], the total colony infestation level can be calculated. Treatment threshold is > 3,600 total live mites in July/ August in the southeastern US.
- **Wax, more specifically Beeswax** – The unadulterated white lipid substance that is produced directly from the abdomen of honey bees and fashioned by them into comb.

Appendix II – Allowed and Prohibited Substances, for CNG Beekeeping

Prohibited Substances

Acetic Acid (vinegar) – Prohibited when used as a hive fumigant
Aluminum phosphide (Phostoxin)
Amitraz (Miticur, TakTic, Mitac)
Bee Go
Chlorine Bleach – except in dilute form to clean extraction and bottling equipment and to disinfect AFB-infected woodenware.
Chlorpyrifos (Dursban)
Copper Naphthalate (wood preservative) – Except when used exclusively on exterior hive component surfaces.
Corn Starch
Coumaphos (CheckMite+)
Fenpyroximate (Hivastan)
Fipronil (Max Force Gel roach bait)
Fluvalinate (Apistan, Mavrik)
Fumagillin (Fumidil-B)
High Fructose Corn Syrup (HFCS)
Honey Robber
Hydramethylnon (Max Force Gel roach bait)
Lincomycin
Mineral Oil (FGMO) – Prohibited when used as a fumigant.
Moth balls
Naphthalene
Oxytetracycline (Terramycin)
Paradichlorobenzene (PDB, Para-Moth)
Permethrin (GuardStar)
Tylosin Tartrate (Tylan)
Non-irradiated pollen – prohibited as supplemental feed, except when non-irradiated pollen is sourced from the same CNG beekeeping operation
Home-Made Pollen Patties or Substitutes which contain vegetable oil (a grease patty), or other non-pollen protein sources, such as but not limited to Brewer's yeast, egg yolk, any flour (corn meal, soy flour, potato flakes, etc.), or any milk product, including whey protein.

Allowed Substances

Acetic Acid
Apiforme (made from Stinging Nettle (formic acid derivatives), Sorrel (oxalic acid), oils of thyme, lavender, eucalyptus, cajuput, and tea-tree)
Api Herb
Apple Cider Vinegar – For in-hive trapping small hive beetles, treatment of nosema, and in small amounts added to sugar syrup as a 'preservative'
Bacillus thuringiensis – to treat stored honey comb for wax moth damage
Bee Tea (see reference to recipe in Appendix I)
Boric Acid – For in-hive trapping of small hive beetles
Certan or B401 (Bacillus thuringiensis, subsp aizawai) – To prevent wax moth damage to stored honey comb
Diatomaceous Earth – in a Freeman trap to kill adult and larval SHBs and outside hives as a soil treatment to kill SHB larvae
Essential Oils (ApiGuard, ApiLife VAR, clove, white thyme, wintergreen, lemon grass, etc) – As a single treatment per calendar year not to exceed one month for cases of a documented severe Varroa infestation [14. (a)]. Very small amounts of the essential oils may also be added to sugar syrup as a preservative.

Ethylene Oxide – For the sterilization of woodenware only

Fischer's Bee Quick

Formic Acid (Mite Away II pads, Mite Away Quick Strips, MiteGone wafers, Formic Acid Fumigator [Amrine, Reference 10.]) – One treatment per hive per calendar year (for a maximum of 21 days for Mite Away II pads, 7 days for Mite Away Quick Strips, 24 hours for a 50% Formic Acid fumigator). Must be used in accordance with application instructions (including ambient temperature). May not be used while honey supers are present on the hive despite application instructions. Allowed only if demonstrated Varroa infestation level requires treatment [14. (a)].

Gamma Radiation – For the sterilization of woodenware and pollen patties only

Honey B Healthy (emulsified lemon grass and spearmint oil)

Honey Vinegar

HopGuard (made from an organic acid found in the hop plant, *Humulus lupulus*) –

Treatment for a maximum of 21 days per calendar year. Only in accordance with application instructions and in colonies with demonstrated Varroa infestation levels above accepted treatment thresholds [14. (a)].

Lactic Acid

Lecithin – As an emulsifying agent for essential oil recipes

Menthol – Only for severe and documented Tracheal mite infestations.

Mineral Oil, Food Grade (FGMO) – Allowed for in-hive trapping of small hive beetles and coating of extraction equipment ONLY; prohibited as a fumigant.

Nozevit (20% oak tree bark, 80% water)

Oxalic Acid

Plastic comb substitutes (Honey Super Cell, Permacomb)

Pollen – For supplemental feeding must be irradiated and with no additives if purchased.

May be non-irradiated if sourced from the same CNG operation only. Home-Made pollen patties which contain only the CNG beekeeper's collected pollen, water, and white granulated cane sugar.

Pollen Substitutes – Commercial only, not home-made (Bee-Pro, Brood Builder, Ener-G-Plus Bee Diet, Feed-Bee, MegaBee, Ultra Bee)

Home-Made Pollen Patties which contain only the CNG beekeeper's collected pollen, water, and white granulated cane sugar.

Powdered Sugar – Only for the Dowda method of powdered sugar dusting and Sugar shake test. Only powdered sugar without corn starch may be used.

Pro Health (lemon grass and spearmint oil)

Resveratrol (grape skin extract)

Soil Nematodes – *Heterohabditis indica* for the control of small hive beetle (SHB) larvae.

Sucrose Octanoate ester (Sucrocide) – A sugar ester

Thymol-based wafers and gels (ApiLife VAR, Apiguard)

Vegetable Oil – Organic vegetable oil only. Used in SHB traps and in documented cases of severe tracheal mite infestation.

Vitafeed Gold

XenTari (*Bacillus thuringiensis*, subsp *aizawai*) – To prevent stored honey comb from wax moth damage.

Appendix III – References

1. "Pest Management Strategic Plan for Honey Bees in the Mid-Atlantic States",
<http://www.ipmcenters.org/pmsp/pdf/MidAtlanticHoneyBeePMSP.pdf>
2. Russian Queen Breeders Association open mating plan,
<http://russianbreeder.org/RQBA%20Plan.pdf>
3. Florida Dept of Agriculture "Best Management Practices for Producing Queens",
http://www.doacs.state.fl.us/pi/plantinsp/apiary/bmp_hbq.doc
4. National Organic Program's National List of Allowed and Prohibited Substances,
<http://www.ams.usda.gov/>
5. National Honey Board, <http://www.honey.com/consumers/honeyinfo/default.asp>
6. Mangum, WA. Comb Foundation Part 3: Building Blue Comb. *American Bee Journal* 146 (3): 239-241, March, 2006.
7. Conrad, Ross. Natural Beekeeping: Organic Approaches to Modern Apiculture, Chelsea Green Press, 2009.
8. Goodwin, Mark and Van Eaton, Cliff. Elimination of American Foulbrood without the Use of Drugs: A Practical Manual for Beekeepers. National Beekeepers' Association of New Zealand, Inc., 1999.
9. Gajger IT, et al. "Nozevit patties" Treatment of Honey Bees (*Apis mellifera*) for the Control of *Nosema ceranae* Disease. *American Bee Journal* 149 (11): 1053-1056, November, 2009.
10. Amrine, JW and Noel, Robert. Formic Acid Fumigator for Controlling Honey Bee Mites in Bee Hives. <http://www.wvu.edu/~agexten/varroa/FormicAcid.pdf>

Appendix IV – Sample Hive Record

Date	Apiary	Queens, Swarms, Supercedures	Color / Mark	Mite Treatment	Sticky Board Mites	Sugar Shake Bees	Sugar Shake Mites	Mites per 100 Bees	# Pupae Cells Uncapd	# Pupae with Mites	% Brood Infested	Honey (supers)	Feed (gals patties)	Observations
04/15/03	home	new nuc	brown / red											
06/17/03	west field													
07/30/03	home											2		
08/01/03													3 1/2	
08/04/03				thymol on	94								0 1/2	deformed winged pupae at hive entrance
08/25/03				thymol off	6	300	4	1.3						
02/20/04														
04/05/04	fruit field													
04/28/04														
06/09/04	home													
06/12/04					68							1		
07/16/04		reQ CarniVSH	golden / green									2	2 0	
08/10/04				formic on	191	150	18	12.0					2 0	lots of SHBs in feeder, no SHB larvae
08/29/04				formic off										
09/05/04					12									
10/03/04													3 1/2	
02/07/05														weak, but alive with brood
03/06/05														building up
04/03/05		swarm	dark / none											
07/29/05												1		queen seen
08/02/05						300	12	4.0	120	16	13.3%			
02/28/06														average, brood present, no drones
07/15/06												2		
08/01/06		supercedure	gold br / none											
08/15/06						250	6	2.4						
08/29/06													3 1/2	
09/20/06													1 1/2	
02/15/07														average
03/25/07														split to hive 4, rearing new Q in split
05/30/07												2		
06/07/07	west field													
07/30/07												2		lots of SHBs at top, no SHB larvae
08/05/07	home					200	11	5.5					2 1/2	
08/26/07													1 1/2	still light

Appendix V – CNG Operation and Hive Transition Table

	<u>Previous Exposure</u>	<u>Type of Exposure</u>	<u>Exposure Number</u>	<u>Transition Schedule</u>
A	prohibited apiary location	land	any	1
B	prohibited pesticides on land	land	any	1
C	permethrin (GuardStar yard drench)	land	any	1
D	used woodenware	woodenware	any	allowed
E	used brood comb (from nuc)*	brood comb	any	2
F	used brood comb (from CNG beekeeper)*	brood comb	any	2
G	paradichlorobenzene (Para-Moth)	brood comb	any	1
H	oxytetracycline (Terramycin)	brood comb	any	1
I	tylosin tartrate (Tylan)	brood comb	any	4
J	lincomycin	brood comb	any	1
K	fumagillin (Fumidil-B)	brood comb	any	1
L	prohibited pollen substitutes	brood comb	any	1
M	coumaphos (Checkmite+)	indirect**	< 6	1
N	coumaphos (Checkmite+)	indirect**	> 6	prohibited
O	coumaphos (Checkmite+)	brood comb	any	prohibited
P	formic acid	brood comb	any	3
Q	thymol (ApiLife VAR, Apiguard)	brood comb	any	3
R	fluvalinate (Apistan, Mavrik)	brood comb	1 – 2	1
S	fluvalinate (Apistan, Mavrik)	brood comb	≥ 3	4
T	amitraz (Miticur, Taktic, Mitac)	brood comb	1 – 2	1
U	amitraz (Miticur, Taktic, Mitac)	brood comb	≥ 3	4
V	fenpyroximate (Hivastan)	brood comb	any	prohibited
W	hydramethylnon or fipronil (Max Force Gel roach bait)	indirect**	< 6	1
X	hydramethylnon or fipronil (Max Force Gel roach bait)	indirect**	> 6	prohibited
Y	FGMO (food grade mineral oil) fumigation	brood comb	any	1
Z	used hives with bees	entire hive	any	4

* From a source outside your operation (typically purchased).

** Only when used inside a SHB trap in which the bees had NO direct exposure to the chemical.

Transition Schedules:

1. Permanent suspension of exposure (immediate compliance) with no transition required.
2. Mark purchased frames and remove their used comb within two years.
3. Previous treatments to be recorded and considered in the allowed exposure of each bee hive in the operation (once per calendar year for either Allowed treatment).
4. Prior brood comb replacement or operation expansion schedule that achieves the removal (or 'dilution') of at least 60% of the exposed comb prior to being CNG Certified. Removal and replacement of the remaining (< 40% of) exposed comb within the first two years after certification. Each frame will require marking at the beginning of the transition period, to ensure that all of the previously exposed comb is replaced within two years after CNG Certification. Permanent suspension of exposure (immediate compliance).