

The Case Against Round-Up

by Terrence N. Ingram

Colony Collapse Disorder (CCD) has been devastating honeybee colonies across much of the country and world during the past few years. There have been many theories about the cause of this calamity. More and more the research is leaning toward insecticides as the cause. Perhaps this is not quite in the right direction to which we should be looking. Perhaps we should be looking at Round-Up, which presently is the most commonly used herbicide in the world.

The author has been keeping bees for 55 years, with up to 250 colonies in some years, and producing an average high of 200# of honey per colony. Through selective breeding 20 years ago, he had produced a Carniolan/Caucasian strain of honeybees, which seemed to be definitely resistant to both mites, wintering well using very little honey, were gentle and very good honey producers, only to have all of these bees decimated by sprays in 1996, when planes were spraying neighboring fields of soybeans every three weeks from Mid-June to the 20th of August. Thousands of acres were sprayed over a period of four or five days each time, some of these acres within 1/4 mile of his home yard. There were no dead bees in front of the hives to document his losses; the colonies just collapsed, then would almost recover within three weeks, only to be devastated once more. The colonies were all dead before the end of September. The commercial farmer claimed that his planes were only spraying Round-Up, and no insecticides, so there should be no damage to honeybees.

As far as the author is concerned, Round-Up is causing CCD. It has been the major cause of his bee losses for the past 13 years. It has been 13 years since he has enough honey to extract. As he explains what Round-Up does to a bee colony think about how your bees have reacted at different times of the spring and summer during the last few years. Perhaps you have experienced some of the same problems, but never knew what was happening to your bees.

Have you lost good young queens right during the middle of a honey flow, or in the spring when the colony was in the midst of really expanding? Have you had colonies which did not expand during the late spring, even though they had lots of brood every time you looked at them? Have your colonies experienced spring dwindling to such a point they either die or abscond? Have you been forced to feed your colonies to keep them alive? Have you looked into your colonies and seen dead sealed brood outside the cluster of bees? Have you lost colonies within a period of just a few weeks? When these colonies are gone, is there still sealed brood in the center of the area where the cluster was? Have you put new packages of bees into hives with beautiful used brood comb, only to have the bees abscond, or disappear within two weeks after installing them? Do you have an unusually high loss of queens in the spring, either from your packages or from your over wintered hives? If the answer is yes to any of these questions, then you may have experienced Round-Up!

Twenty years ago by raising his own own queens for years and never bringing in new queens, the author had developed a strain of honeybees which he felt were superior to any he could buy. They were gentle, never having to use smoke to take care of them. They had varroa mites, but lived with them with no chemicals needed. The mites were not an economic problem! The hives wintered over using almost no honey, with many of the hives still having almost a full super of honey left in the spring. They were good workers, bringing in as many as 10 to 12 medium supers of extracted honey or 10 supers of Ross Rounds in one season. The bees never swarmed, his having lost no swarms from 250 hives for two years in a row, while producing the above mentioned crops of honey.

Before the first aerial spraying in mid-June of 1996 each colony had ten deep frames of brood and a bee population filling two to three supers. A few days after this first flight each hive was left with not enough bees to keep the ten frames of brood warm, so the outer frames on each side of the cluster would chill and die. In three weeks enough brood would have hatched, so the colonies would have enough bees to once again cover the ten frames of brood. The chilled frames of brood would be cleaned out and the queen would be once again filling them with eggs and brood. During this time all of the honey in the supers was used to feed the brood. Then in three weeks the colony would be sprayed once more and this time there would only be enough bees left to cover a couple of frames of brood. The other eight frames of brood would be chilled, as we had several cold nights in a row, which is sometimes common in our Northern Illinois climate. It seemed that two sprays, which occurred within four weeks, was all it took to kill the whole colony before winter. But the plane kept spraying every three weeks all summer. The bees never had a chance and all of the hives were dead before winter.

Over the years since then the author has tried to find out what insecticides were being responsible for these kills of honeybee colonies. Each spring for the past 13 years the author would purchase new packages only to have them all be killed by fall. Many times the farmers insisted that they were not using insecticides, only Round-Up, and yet the bees still disappeared. When the author complained to the Illinois Department of Agriculture, inspectors were sent out to inspect his losses. Their final decision was that they could find no illegal use of pesticides. Legal or not legal, his bees were being killed.

State bee inspectors came and inspected his colonies and stated that he had foulbrood in all of his hives. The author told the bee inspectors that they did not have to come back until they could tell the difference between foulbrood and chilled brood, and until that time they were doing a disservice to the beekeeping industry. Those same hives and equipment have been used ever since with no sign of dead brood until after a spray event has occurred. Observation hives were started using frames from these inspected hives and the observation hives have been alive for three years with not signs of dead brood, except for a short time after a spraying of Round-Up.

The author has since determined that if Round-up is last used from mid to late August, the hives cannot recover well enough to even make it into the winter, unless they receive lots on feed, sugar syrup and/or honey. The queens may have been killed, and if not, there may not be enough bees left to take care of any brood they do have, especially if there is a cold and wet fall and the colony will die. Even if the beekeeper adequately feeds the colonies, the hives may be found empty of bees later in the season. The bees may have just absconded.

In this area Round-up is the major cause of spring dwindling. Colonies may be strong coming out of the winter, but after Round-up has been applied within one mile of the colonies, their populations will rapidly dwindle and the hand writing is on the wall for those colonies, unless they have plenty of food left over, or are fed an ample amount of food. If the Round-Up is used before the colonies are really flying well, the hives may survive, if they would still have about 40# of honey left over. The author put a full super of honey on one surviving hive this last spring and the bees used almost all of this honey getting their population back to the point where it had been when it came out of the winter.

What does Round-up Do?

Round up kills the field force or at least makes them so sick they do not come back to the hive, which for a honeybee is the same difference. A beekeeper never finds enough dead bees near the hives to send in to be tested. How can you walk over 16 square miles looking for dead bees?

Many of the field bees are killed almost immediately, depending on how close the field is to where the hives are located. If the field that is sprayed is within one mile of the hives then the hives that were foraging in that direction lose their field force within three days. Other hives will lose their field force more gradually. But before a week all colonies will be about the same. The problem is that if they are not killed outright, these workers before they get too sick, will bring back contaminated food to the hive to be used to feed the young. If a colony has 20-40,000 bees in its field force, a lot of contaminated food is brought back and stored in the hive before the field force dies.

Something eventually makes the bees sick, and any beekeeper knows that a sick bee will leave its hive so the rest of the colony may remain healthy and other bees do not have to take the time to carry out their dead bodies. It seems that Round-up gets into the royal jelly gland of the workers and the larva that are fed this food, die also. If a queen is really laying eggs, over 3,000 per day, she may be killed by this poisoned royal jelly. The colony then tries to requeen, but because all of the young queens are fed the same poisoned food and they may die in their cells. So within two weeks the colony will be queenless, with no young larva and no way to raise a new queen. Such a hive must have a queen added, or it will die very shortly.

If a hive has little extra food in the hive, the newly hatched bees try to fill the void and become the new field force, so they can get the necessary food for the hives' survival. The problem is that these bees are also dead within a day or two of starting into being field bees. If the hive has plenty of food, the new bees that have just hatched, don't have to leave the hive to find the necessary food, and then the hive may possibly recover. But it will be at least three weeks before things will start to get back to semi-normal in the hive. When farmers spray Round-Up every three weeks, the hives have just started to get back to normal, when their populations are sent into another tail spin.

If the colony does not have sufficient food in house and the weather is inclement and/or cold, the hive may be dead within two weeks. The only thing remaining in that hive will be some sealed brood, some of which has hatching bees which have died part way out of their cells, having starved with their tongues hanging out. Even if the hive survives there will be dead sealed brood outside the now reduced bee cluster, which have chilled. These cell cappings remain raised and not sunken like is seen with foulbrood. These cappings remain raised for over five years. But a bee inspector, who can't tell the difference, will diagnose the hive as having foulbrood. I do not doubt that there may be some foulbrood spores found in this comb, but there are probably many other viruses found there as well, which some University research studies are finding and trying to blame for CCD. These Universities are not looking in the right direction for the true cause of what killed that colony.

Until Round-up is banned we are going to have to try to live with it. That means we are going to have to watch our hives very closely at all times and watch out for spraying in the vicinity of the hives. This spraying does

not have to be just aerial spraying, it could be tractor or truck spraying, which has the same effect. It may be aggravated by other chemicals, but most of the time the farmers near my hives claim that they have been using nothing other than Round-Up.

The best colonies will be the ones which lose their queens. The queens don't have to be old. They may be only two months old, but if laying at full speed, over 3,000 eggs per day, they may die from being fed this poisoned royal jelly. If this happens, the chances of the colony being able to raise a new queen to replace her is almost nil, for most of the young larva will be fed this same poisoned food. Even though the colony survived the author has lost many of his best queens because of this and new queens had to be added. At first the author didn't know what was happening, but after watching very closely and keeping records he have finally put two and two together to determine what actually was happening. His three observation hives in the office have been a real blessing as he has been able to watch what has been occurring in his other hives.

Whenever a beekeeper finds the size of his/her hive cluster rapidly reduced to about 1/4 of its original size, be concerned. When almost half of the workers are fuzzy, showing they are freshly hatched, the beekeeper knows that the other half of the bees are just a few days old. If this is the case, the beekeeper wants to be sure that there is plenty of food available for the hive, so these young bees don't have to leave the hive to find food. In a normal hive, the fuzzy bees account for less than one out of 20 bees, unless the beekeeper is looking in the brood nest where the young bees are hatching, he or she normally doesn't really notice the fuzzy bees.

Round-Up doesn't just get into the honey and/or pollen, but it migrates into the comb. Once it is in the comb, the bees don't like to even walk on the comb. If there becomes many combs contaminated with this chemical, the bees will actually abscond the hive, leaving fresh brood behind, which will be chilled within a day or two. This may occur in a strong or weak hive, causing what some would call CCD, except I know the cause. It may happen in May, June or even September.

The author put a frame of this contaminated dark comb into a two frame observation hive, placing the contaminated comb in the bottom of the hive, with foundation in the frame above it. When he placed some new bees and a queen into the hive, the bees tried to keep as far away from this contaminated comb as possible. They started to draw out the foundation in the top frame from the upper two corners and would not even walk on the comb in the lower frame. After about a week when the foundation in the top frame was about 1/2 drawn out, the bees finally decided to leave and absconded the hive, leaving young brood and eggs behind. They had never used a single cell in the contaminated comb.

So the author took that frame out and scraped this contaminated comb off of the plasticell foundation. Then he coated this plasticell foundation with clean wax and put it back in the hive. When he placed a new queen and workers in the hive they drew out the foundation on both frames and he never saw any more ill effects of the poison that year.

Another two frame observation hive was using the bottom frame for brood when Round-Up was applied over 1/2 mile away from the hive in August. The brood away from the reduced cluster died, the smaller cluster of bees continued to raise brood in the top frame and by being fed, they made it through the winter. But the next spring when the cluster was expanding they needed both frames for brood. Instead of using this old comb they tore it down and built out new comb on the plasticell foundation.

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Even though there was plenty of brood and the cluster should have been expanding, it did not expand while the bees were tearing this comb down. It seemed that the bees which worked on tearing this comb apart died, so there was a constant drain on the population in the hive. This old comb was not removed from the hive, but was just dropped to the bottom of the hive. There the bees

covered it, (comb pieces piled 1/2 inch thick across the whole bottom of the hive) with propolis, like they would a dead mouse. After that was done, then the hive population started to expand and is still going two years later, issuing swarms each summer.

Two years ago, by closely monitoring the hives which were being used for his beginning beekeeping class, the author was able to gather circumstantial evidence that every time the herbicide Round-Up was used by neighboring farmers his colonies were affected. Different hives were affected differently depending on: how much excess honey had been stored in the hive at the time; how much brood was being raised; how close the sprayed field was to the hives; what target plant was being sprayed; how much time had passed since the last spray; what other blooming plants were near the sprayed fields; and what the weather was like at the time of the spray application. Research must still be done to determine how all of these factors affect the honeybees.

The colony's field force was lost 100% of the time. How fast a colony recovered from this loss depended on some of the other factors listed above. Sometimes the queens were killed, as well as some of the brood and field force. Because of this the author believes that there is something that is brought back to the hives in either the honey, or pollen, that gets into the royal jelly, which the queen and larva are fed, which is strong enough to kill the recipients of this food. A queen in a strong hive laying from 3,500 to 4,000 eggs per day is fed copious amounts of royal jelly from many different bees. If enough of them have this chemical in their royal jelly, or if this chemical is being concentrated in the royal jelly producing gland in the worker's heads, the queen would be the biggest receptor in the hive, and thus would be most affected by such a chemical. A couple of the author's best queens, (most prolific), disappeared from their hives just a few days after the sprays were used the past two summers. All young unsealed larva would also be killed.

We still must determine the answers to several questions: How do 100% the field bees die during the initial spray even if they are not all out in that field at the time of the spray? How do they pick up the spray after the event? Do they accumulate the poison by walking on the sprayed plants, or do they accumulate it from the nectar, or from the pollen of the plants they are working? How many days, or hours, does it take for a worker bee to be unable to fly, or to be unable to find her way back to the hive?

Because there is something definitely affecting the brood and queens, some of the workers must be able to make at least one or two trips back to the hive to bring this chemical back to the hive with them. How does the chemical eventually kill the workers that do get back? long does it take after a spray event before the complete field force has disappeared? These are all questions for which we need to get an answer in the future.

Living with Round-Up! What Can Be Done?

The author recommends that a beekeeper check his or her colonies at least once every week to determine how strong are the populations and how much honey stores are available for the bees. The colony must also be checked to be sure the queen is alright and still laying eggs. If the queen has been killed, the

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chances are very poor that the colony will be able to raise a new one from any of its own brood. They may try, but the odds are that all of the young queens will die in their cells. A new queen or a sealed queen cell must be introduced, or the colony will die very shortly. Of course, there is no guarantee, for it may die or abscond even then.

If the queen is still laying eggs, but there are less than two full frames of sealed honey available for the bees, the colony must be fed

immediately. It does not matter whether sugar syrup is fed or frames of sealed honey are used. Feeding must be continued until the colony has at least 6 frames of brood with three frames of food available. Feeding must be done, whether it is spring, summer or fall. Feeding the hive is the only hope that the colony has of surviving.

Old combs should not be used if the hives had been exposed to Round-Up previously. Be sure to use fresh foundation to start out your new packages, or when capturing a new swarm, to lessen any problems with contaminated combs. If you are using plasti-cell foundation the old comb can be scraped off, but then you need to re-wax the foundation with uncontaminated wax.

I urge all of the bee supply companies which are making beeswax foundation to get their beeswax checked for Round-Up residue in their wax. Round-Up contaminated beeswax could possibly be used for candles, but should not be used for foundation.

Living with Round-Up is not easy. If the farmers use Round-Up more than once during the summer there is almost no way to keep the hives alive. Being exposed to Round-Up once may not kill the hive, but it will reduce the population so much that the bees may not get strong enough to gather excess honey for the beekeeper that season. If the only use of Round-Up occurs in early to mid-April, the hive may gather some excess honey, but only if the beekeeper is on top of the situation and feeds the hives very liberally, immediately. If the exposure occurs in Mid-June or later, the beekeeper will be lucky to have the hives alive with adequate stores for going into winter. If the Round-up is used in August there is almost no hope of getting the hive populations strong enough to make it through the winter, even if they are fed very liberally. Some neighboring beekeepers are even considering the possibility of killing off their hives in the fall and starting with packages every spring, for they are losing too many hives, even though they spend a lot of effort and money to feed their hives, both spring and fall.

Because of his experiences, the author firmly believes that Round-Up is the major cause of CCD in honeybees in this country! He would like to receive comments from other beekeepers about their experiences with Round-Up. Round-Up should be banned for any use within two miles of honeybees!