

## MAAREC SURVEY PRELIMINARIES

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It has been in all the news....

The New York Times, May 2<sup>nd</sup> edition, storied the plight of NJ beekeepers. “ Joe Linelho, a New Jersey bee hobbyist, began the winter with 40 hives, each with a queen and 50,000 to 70,000 honeybees. In the spring, when fruit growers rent hives to pollinate their crops, he had just 20 thriving hives left, with the rest as dead as the one we just opened, or nearly so, with only a few bees surviving.

Beekeepers across the country have found losses in similar or worse proportions, according to the USDA with the West Coast hit the hardest. And while it is normal for a small number of domestic bees to die over the winter, an Asian parasite, the Varroa mite, is blamed for much of the bee death.

“This is a national problem,” said Kevin Hackett, national program leader for bees and pollination at the Agriculture Department’s Research Service. “We’ve lost at least half of our hives, and 70 percent in some areas. With a couple of million hives in the U.S., and you reduce that population by half, that’s very serious. All the fun stuff – the fruits and nuts and berries – are pollinated by bees,” Mr. Hackett said.

Paul A. Raybold, the New Jersey state apiarist, has so far inspected 756 hives in the state and found 440 of them dead. “You always expect a winter die-off of maybe 5 or 10 percent, but nothing like this,” he said. A warming spell followed by a cold snap last winter caught many bees away from their honey supply, but Varroa mites are the real problem Mr. Raybold said”.

The Wilmington News Journal, March 31 edition told the story in Delaware..

Warren Seaver’s work force took a hard hit in Dover over the winter. About 20 percent of it died. And the death toll among honeybees could be much worse for other Delaware hive keepers, said Dewey Caron, University of Delaware professor. Reports at last week’s annual meeting of the Delaware Beekeepers Association put the estimated winter death rate as high as 50 percent. “...Losses are... largely driven by mites...but the mites could be transmitting a virus like a cold, and that may be what actually kills the colony,” he [Dr Caron] said.

It’s bad news for beekeepers, farmers and anyone who likes to eat. Honeybees are the Clydesdales of pollination, the process that helps a blossom become a fruit or a vegetable. Though other insects pollinate – bumblebees and butterflies, for example – none comes close to the efficiency of the honeybee, which pollinates a third of the food and fiber produced, according to Delaware Department of Agriculture apiary inspector, Bob Mitchell.

“It’s too early to know if or how the problem might affect consumers,” [quoting John Tulloch, DE and EAS treasurer, who]...keeps eight colonies in Odessa.... “You develop an appreciation for the colony,” he said. “You open one of those things up and see the bees working away. You understand what they’re doing, and it’s an exercise in organization and efficiency.”

And Christian Science Monitor put a national spin on the situation in a May 24 release ..

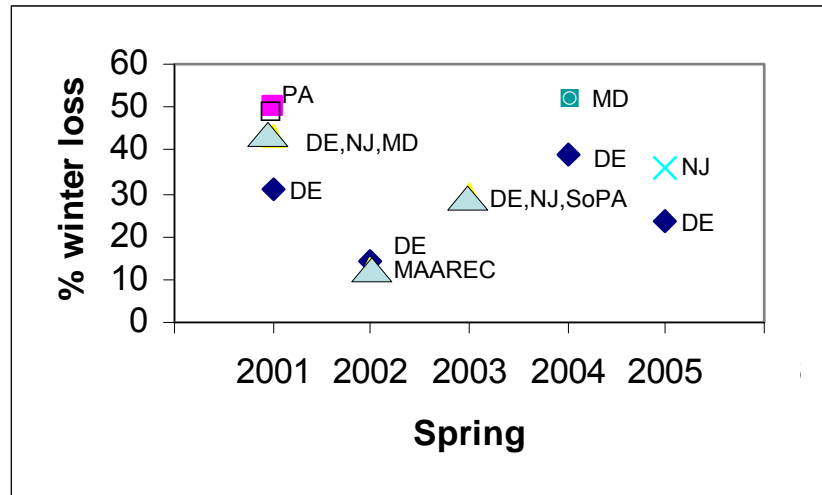
Richard Uzzell [a new NC beekeeper] “will, if nothing else, keep his family in honey for the winter. But amid one of the worst-ever winters for bees – ravaged by mites, half of America’s 2.5 million colonies perished – he’s helping to solve a quiet agricultural crises....The stakes were raised this winter, when Asian “vampire” mites, grown immune to pesticides, ravaged the hibernating hives. In Pennsylvania, some farmers opened their hives this spring to find that 75 percent of their bees had perished.”

To help ascertain how Mid-Atlantic beekeepers are coping with mites MAAREC beekeepers were individually and via state Newsletters sent a questionnaire from Penn State University and University of Delaware this past spring. The survey represents an effort to establish a baseline of information on what beekeepers are, and aren’t, doing in the face of Varroa mite parasitism. So far, we have tallied 350 + responses.

**IF YOU STILL HAVEN’T RESPONDED, COULD YOU DO SO NOW PLEASE !**  
**IF YOU PREFER YOU CAN USE THE ON-LINE SURVEY FROM THIS WEBSITE – IF**  
**YOU HAVE MISPLACED YOUR SURVEY FORM AND WOULD CARE TO RESPOND**  
**PLEASE LET US KNOW AND ONE WILL BE PROMPTLY SENT OUT TO YOU.**

One of us (DMC) has been surveying beekeepers through the DE Beekeepers Association newsletter *NewsyBee* for several years. Data of survey (and some MAAREC estimates) for the last 5 years is shown in graph below.

Figure 1. Overwinter loss estimates 2001-2005 in MAAREC region



The record of overwinter losses appears to be somewhat cyclic. During 2000-2001 and again in 2003-2004 winter losses were high. In spring 2001, 36 DE beekeepers responding to a *NewsyBee* survey reported losses of over 900 colonies for a 31.7% loss rate (Huber and Caron *ABJ* 2001.) A *Bee Culture* magazine survey pegged losses in New England, NY and PA at 50-51%, while the region of DE, NJ and MD were listed as suffering a combined 43% loss (Flottum, *Bee Culture* 2001.) Winter losses were widespread in the northern US that winter according to other surveys (Wenning, *ABJ* 2001).

Loss levels were more tolerable in 2002. In spring 2002, 44 beekeepers, owning 1266 colonies, returning a *NewsyBee* survey said their losses were 1/3 the level of the previous year – 181 overwintering colonies died for an overall loss rate of 14.3%. A *BeeAware* survey (Caron 2003) included with the MAAREC April newsletter, revealed beekeepers in DE, NJ, PA, MD and WV, had a similar, in fact slightly lower, rate of loss at 12.3% (272 colonies died with 2208 surviving).

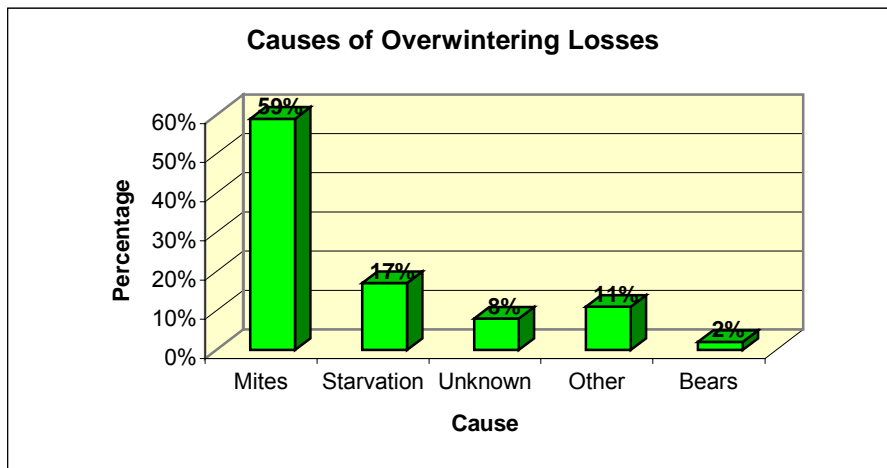
In the 2002-2003 overwintering period, a survey of 75 beekeepers in the 3-state region of DE, NJ and SE PA, reported loss of 542 colonies, of 1795 going into the winter, a regional loss rate of thirty percent (30%).

In spring 2004, 20 Delaware beekeepers in another *NewsyBee* questionnaire, reported losing 155 colonies, a loss rate of 39%. Bob Mitchell, state apiary inspector, on the basis of early season inspections pegged losses as 40-50% of DE colonies that went into the winter. In Maryland, State Apiary inspector Jerry Fischer found losses at 50% among the 930 MD beekeepers who report to his office with mandatory registration.

We are still tallying the responses from our expanded regional questionnaire mailed out in DE, MD and NJ and contained in the PA Beekeepers Association newsletter following our 2004-2005 winter. In NJ the 100 + beekeepers who responded, said they lost 450 colonies – a 36% loss rate. This survey finding is consistent with loss estimates from State bee inspector Paul Reybold (as quoted in the NY Times) although individuals, such as Joe Linelho individually had higher losses. A smaller sampling from DE beekeepers reported losses their losses at 23.8%. Flottum (2005) in the June *BeeCulture* estimated losses in MD, DE and NJ as 33%. Beekeepers elsewhere, including Western states experienced heavier losses according to numerous news articles. The need for almond pollination bee colonies was not met, apparently, in part due to such heavy overwinter losses (J. Traynor, personal communication).

In survey responses analyzed to date, recent overwinter losses were overwhelmingly attributed by respondents as due to mites (59%), with starvation a second major reason (17%). (The other category included poor clustering, wax moth and dysentery). From completed surveys, here is the breakdown:

Figure 2. Percent of winter loss by loss category from NJ Beekeeper Survey



Tallying total MAAREC responses received to date, most beekeepers (32%) characterized their losses as similar to the previous winter with only slightly more reporting that losses were greater (26%) rather than less (23%) compared with the previous winter season. 17% of the beekeepers did not answer the question. Response tally shown in Figure 3 below.

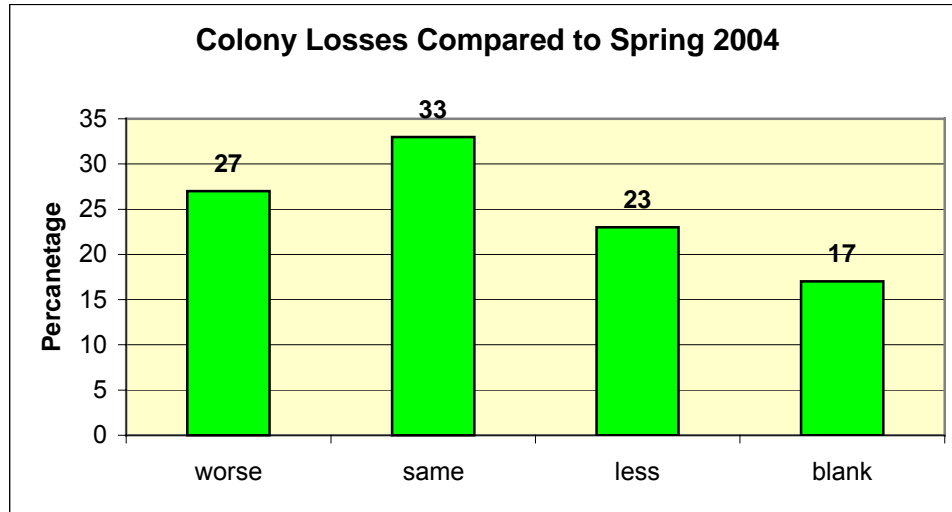


Figure 3. MAAREC beekeeper comparison of past winter losses relative to a year earlier.

Our survey was designed to obtain more than an estimate of bee colonies losses. Under a section on beekeeping philosophy, we asked on the survey what you considered your level of hive manipulation. Of 4 choices, 61% of respondents said they were moderately invasive; only 4% considered themselves highly invasive whereas 28 and 7% respectively considered themselves passive or extremely passive (Figure 4).

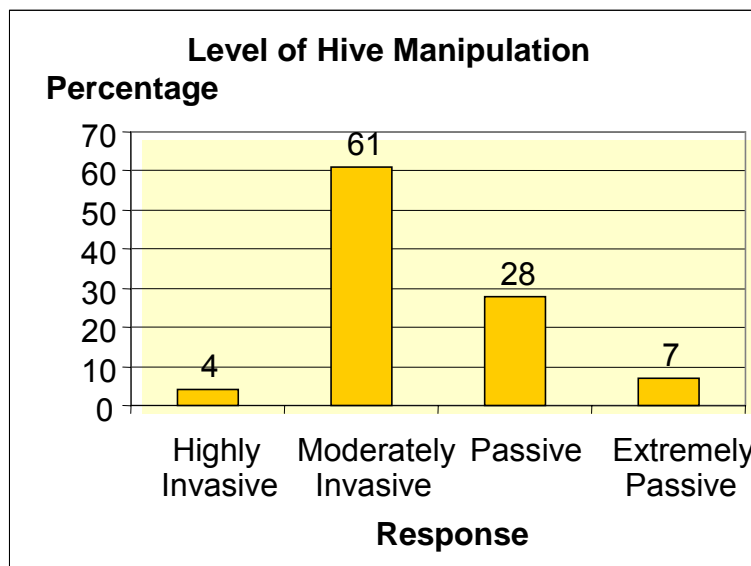


Figure 4. MAAREC self appraisal of individual level of hive manipulation.

The next question on the survey asked if varroa mites had changed your level of manipulative. Twice as many (64%) responded with no -- mites had not changed their hive manipulation level; 36% said yes mites had (Figure 5).

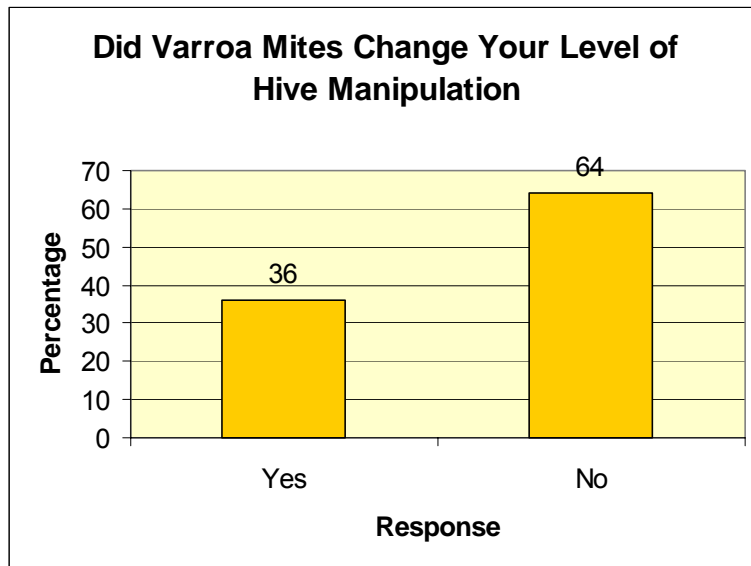


Figure 5. MAAREC beekeeper response to question on effects of mite on hive manipulation level.

For those responding to yes there was a blank asking for input relative to how hive manipulation level had changed. A few responses indicated negative changes such as lost bees to mites, have to buy more replacements, mites are an evil that can't be handled and a similar one that mites have high survival rates no matter what was done to bees. Some said they worried more and had to deal with more dead hives now. One expressed the opinion that over-control and manipulation had made bees weaker.

The majority of responses indicated that they needed to do more – 20% said more such as: more, and more thorough, inspections, more frequent management, greater need to have stronger colonies, the need to do twice the number of hive manipulations and similar responses. Another 22% mentioned the need for more checking using comments such as more brood checking, checking drone brood, testing hive, checking for damage and similar responses. The number one response of respondents (18%) said they had to manage hives in a more invasive manner.

Many respondents (44%) mentioned the need to use chemicals including comments such as have to medicate, more medication, more checking and treatment, change chemicals of treatment, treat more often, and the need to treat so hive lasts >2 years. One respondent indicated that without chemicals they wouldn't be in business. In a similar vein, another respondent said a beekeeper could be wiped out in one year if not treating colonies.

Some 17% of respondents said hive manipulation had changed because they had to use some aspect of mite control that didn't include chemicals: examples included requeen all

colonies, use screen bottom board, more effort with monitoring, culling old comb, and drone removal. Some of these respondents wrote a combination of more than one of these techniques in a true spirit of IPM. One person said they had to spend time to learn about mite biology. Three respondents mentioned the need to find resistant stocks such as hygienic queens or bees with mite resistance and one said they were actively breeding bees to find a better mite resistant stock.

Four respondents who checked no said they had mites from the beginning so they hadn't changed their management philosophy

One of our aims with the survey was to document what beekeepers were using to reduce mite damage. When asked 'Do you treat with Chemicals' more than twice as many said yes (see Figure 6 below) than no. A related question asked if sampling was used to determine mite levels – the number of respondents who said they did sample equaled those who said they did not. (Figure 6).

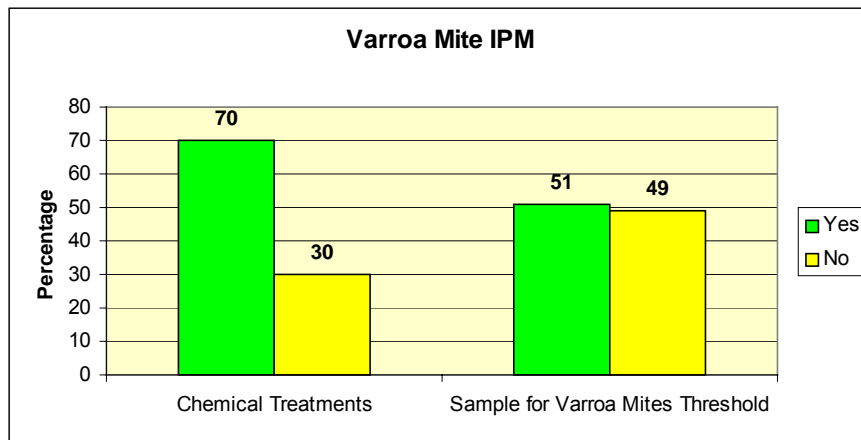


Figure 6. Tally of MAAREC responses about use of chemical treatments (left) and sampling (right).

When asked about whether they felt IPM could delay development of chemically resistant mites, over 9 of every 10 respondents said yes. In a related question, 8 in 10 felt they played a role in development of mite resistance (see Figure 7 below):

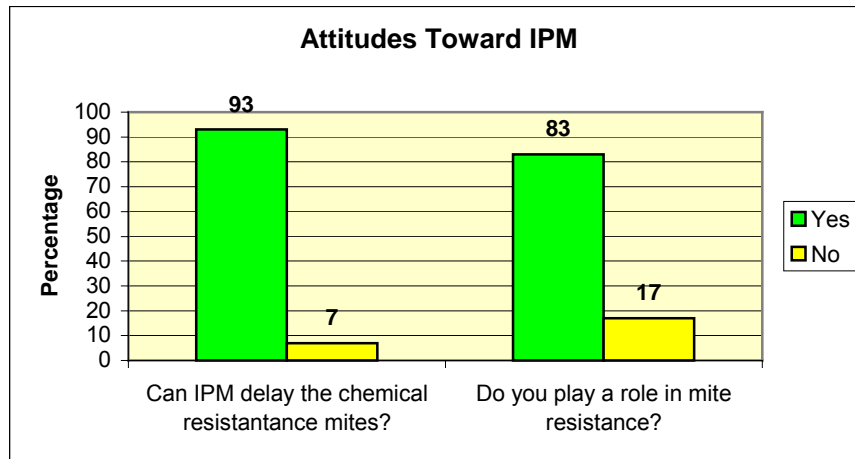


Figure 7. MAAREC responses to questions on IPM and beekeeper roles in mite chemical resistance

In completed surveys, 67% of MAAREC beekeepers answered they were highly concerned about resistant mites and another 27% said they were moderately concerned.

With the vast majority, 93%, of beekeepers saying they felt an IPM program could delay development of mite resistance, we see a role MAAREC can play in helping to provide answers to how precisely we might use alternatives to chemicals for varroa mite control. We believe and most hobbyist and professional beekeepers alike believe that the use of hard and soft chemicals is only a temporary “solution” and that long term changes will need to be made within the bees themselves so they can better resist the mite.

The original host of varroa mites, the Asian bee *Apis cerana*, has such resistance and it has reached an equilibrium with varroa mites; our western bee *Apis mellifera* needs evolutionary time to adapt since it has been a pest target only since this century probably. Can researchers and beekeepers speed up development of mite resistance? Our heavy selection pressure by using miticides has enabled the pest to develop resistance to the current miticides we have to combat mites. It would be most desirable to reverse the process which means changing the host (honey bee) or changing the mite pest itself. And in the interim, with resistance widespread we must come to rely on softer chemicals and non-chemical approaches. It is difficult to believe we can sustain the high levels of losses indefinitely – we need a better solution for mites now.

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