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Economic Threshold for *Varroa* on the Canadian Prairies

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I. Reasons for Using an Economic Threshold

1. Reduced Cost.

By not treating until Varroa levels rise above the **economic threshold** beekeepers ***avoid applying unnecessary treatments***, which are not cost effective. The additional labour costs associated with sampling can be easily recouped, particularly when sampling techniques (such as alcohol washing) require only one visit.

2. Resistance Management.

Fewer treatments mean lower selection pressure thus reducing selection for resistant mites.

3. Lower Hazard of Residues.

II. U. of Manitoba Economic Threshold For Varroa

The thresholds determined by the University of Manitoba are based on 6 years of research (see references below) and over 12 years of hands-on use by Manitoba beekeepers. The University devised two sets of economic thresholds, one for spring and one for fall. Although the economic thresholds are based on the alcohol wash sampling procedure (~300 bees per sampled colony) conversion to sticky board counts can be done with a conversion table. No increase in overwinter mortality or summer honey production has been observed when Varroa among untreated colonies remains below threshold levels. You should be warned, however, that even low levels of tracheal mites increase the destructive force of varroa. The combination of varroa and tracheal mites results in a lowering of the economic threshold for varroa. If both species of mites are present control measures should be implemented in fall to reduce the infestation of one or more of these mites to as low a level as possible to prevent winter loss.

III. Determining Percent Infestation by Alcohol Wash

Step 1. Collect approximately 300 worker bees (1/3 cup) from a brood frame into a sample bottle.

Step 2. Immediately after the sample is collected put the lid on the container so that the bees become anaesthetized by their own carbon dioxide.   Marks on the jar can be used to indicate the approximate number of bees in the sample.

Step 3. Collect samples from at least 5 colonies in a yard of 40 colonies.

Step 4. Fill a bucket with windshield washer antifreeze (good to -40 celcius) and line bucket with a piece of honey straining cloth.

Step 5. Dump the anaesthetized bees from all five jars into a sieve (deep fryer basket from Walmart, mesh size should be small enough to hold the bees, but large enough to let the mites through) and wash (i.e. dislodge) the mites from the bees. Submerge the basket in windshield wiper fluid by moving the bees back and forth in a shaking motion for 2-3 minutes if a precise count is desired (check after shaking for 15 to 30 seconds – the answer to treat or not may be obvious at that time).

Step 6. Then extract and count the varroa on the white straining cloth by stretching the cloth across the top of the bucket.

Step 7. Calculate infestation as a percentage.

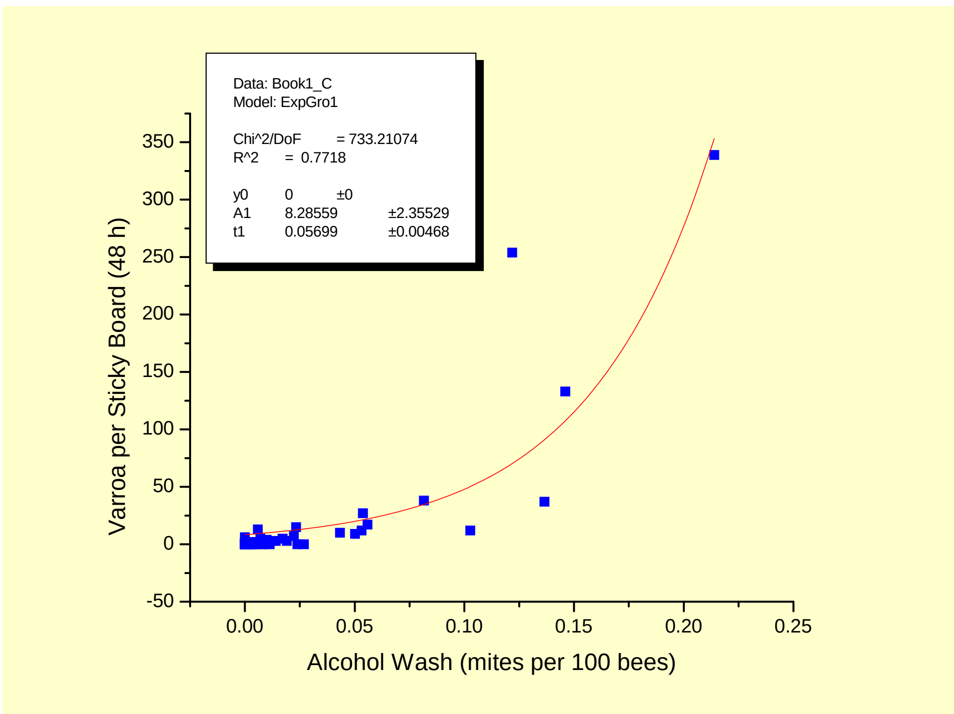
% Infestation = [No. of mites / 300 bees] x 100

If for example, in a sample of 200 bees you find that there are 10 mites then:

10 mites divided by 200 bees = a 5% infestation (or 5 varroa per 100 bees).

IV. Converting from Sticky Board Counts to Percent Infestation

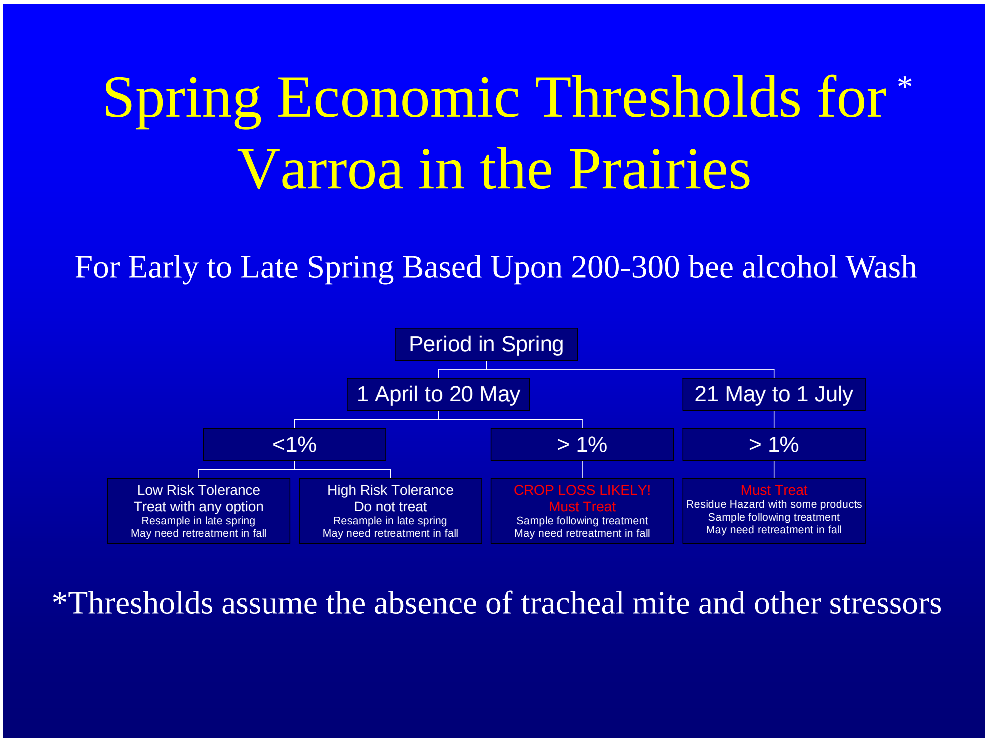
Actual Percent Infestation	Natural Drop	Apistan / Check Mite+ Drop	Formic (Mite Wipe) Drop
0-1%	0 - ½	0-30	5-15
3%	18	50 (1 strip) 185 (2 strips)	76
5-6%	33-43		

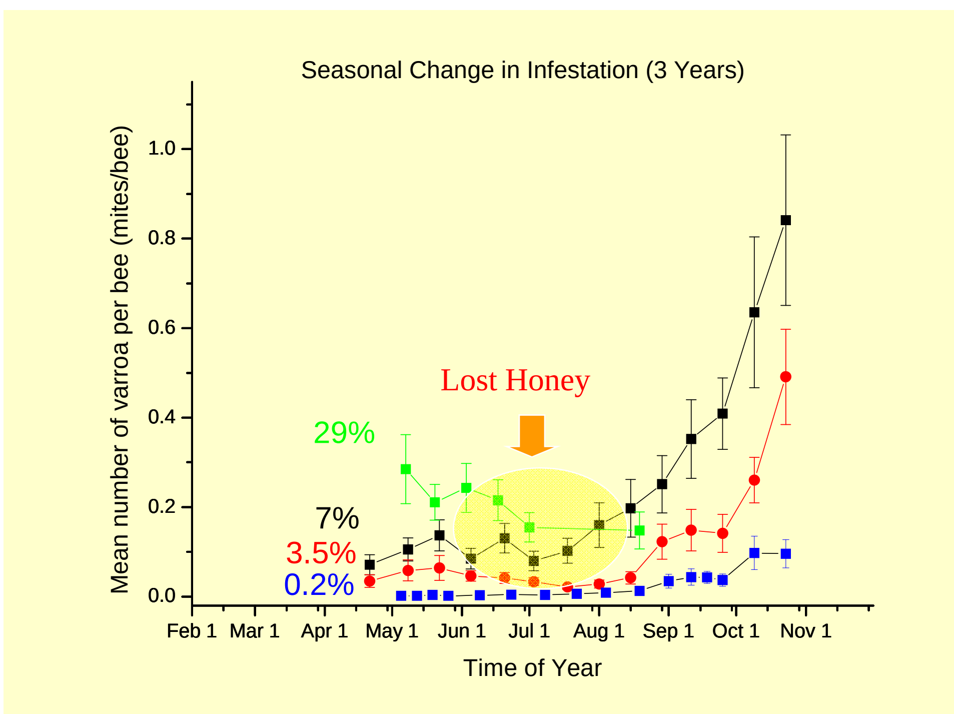


V. Levels of Mites that Require Treatment to Prevent LossManitoba

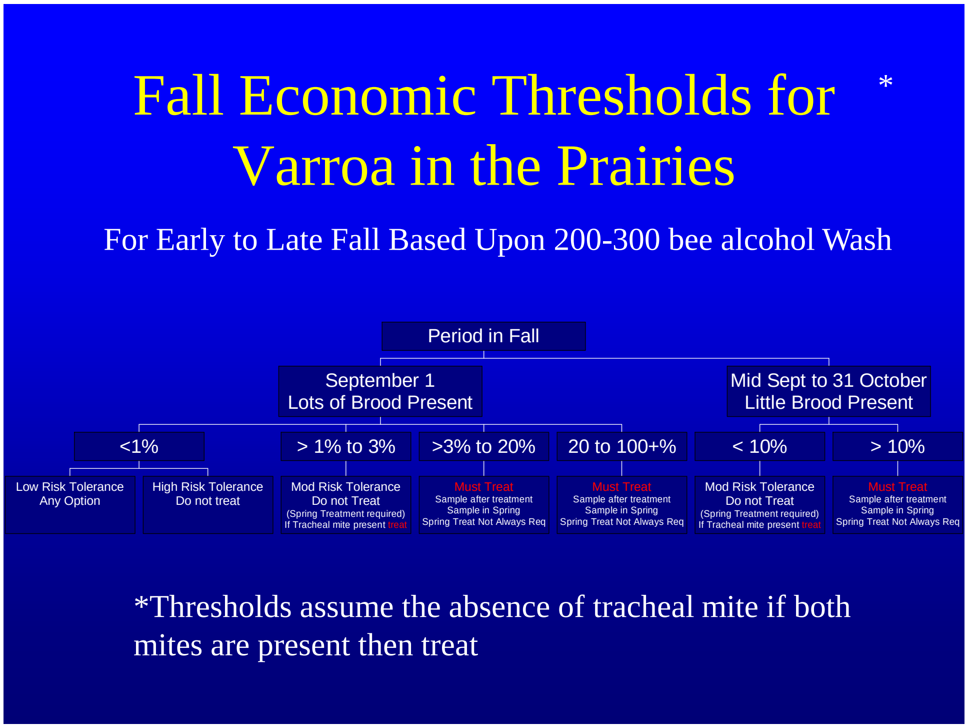
Spring ET Values

(based on a 200-300 bee alcohol wash)

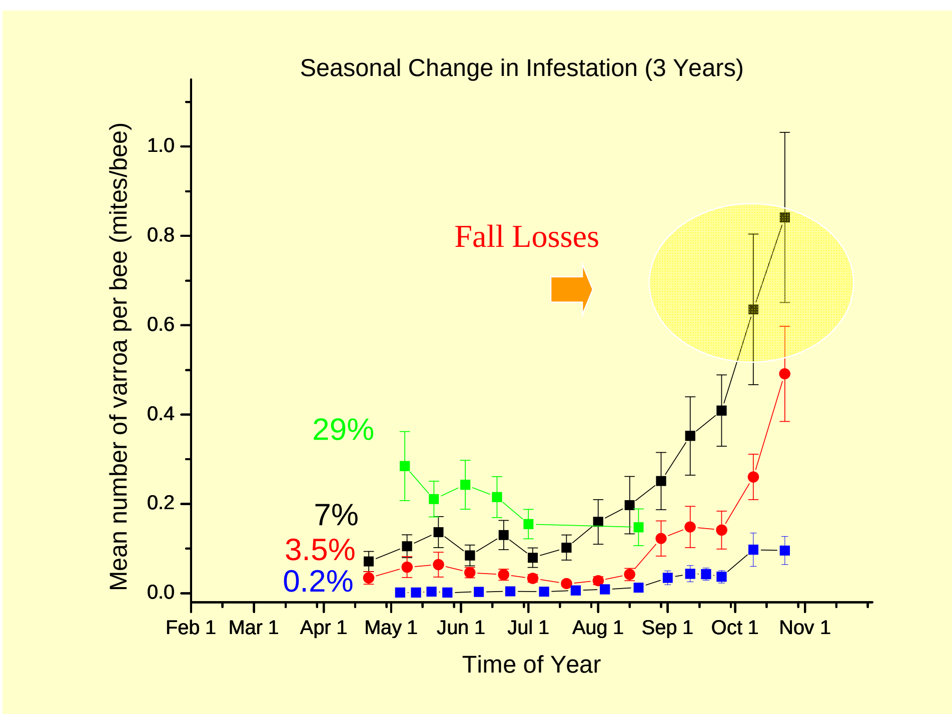




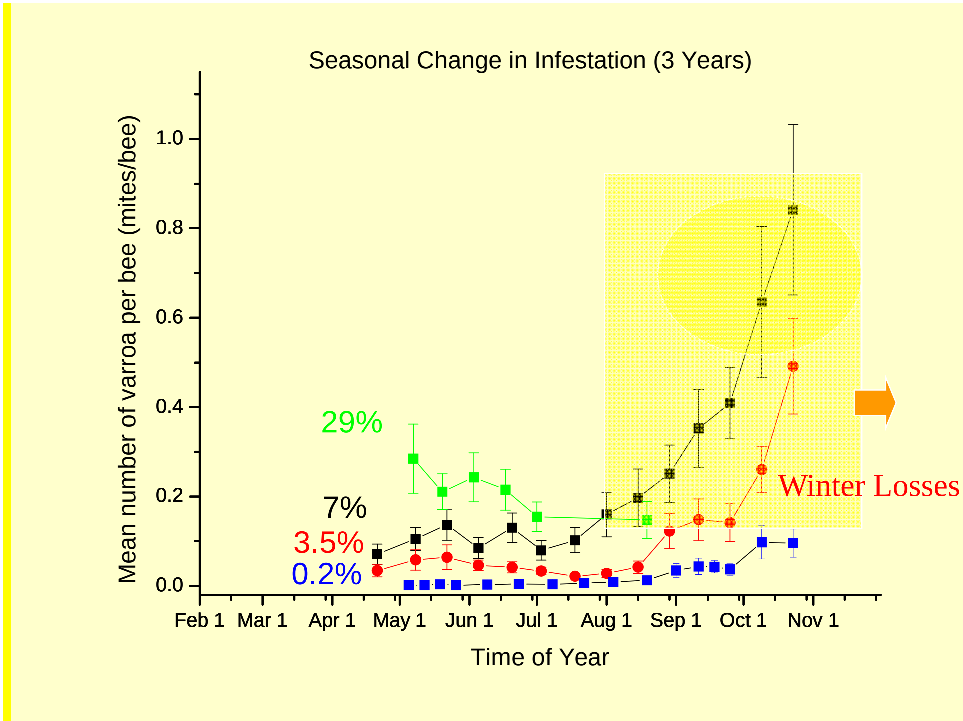
Manitoba **Early and Late Fall** ET Values
(based on a 200-300 bee alcohol wash)



Manitoba **Early Fall** ET Values
(based on a 200-300 bee alcohol wash)



Manitoba Late **Fall** ET Samples
(based on a 200-300 bee alcohol wash)



Supporting Literature

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