



Integrated Pest Management Plan Template

Varroa destructor Mite

Integrated Pest Management (IPM) is a sustainable form of pest management that works to suppress pathogens below economic thresholds, reducing overall colony damage¹. A successful IPM strategy consists of disease prevention, pathogen identification, frequent monitoring, and the use of economic thresholds to guide treatment decisions. In combination, all of these components can be used to create a step-by-step plan that will help beekeepers act quickly on bee health issues, keeping bees healthy and reducing the impacts of new risks as they emerge. A useful tool that should be frequently referred to when making IPM decisions is the IPM pyramid (Figure 1). The pyramid outlines the recommended sustainable steps that can be taken leading up to chemical treatment, while accounting for factors such as colony stress, labour, and management costs. By adopting the basic principles of IPM, beekeepers can develop and frequently refer to a standard decision-making process that aids in preventing pest issues and, if applicable, determining appropriate treatment plans. This decision-making process helps raise awareness and streamline focus on colony health within an operation. An effective IPM plan can decrease treatment costs, increase treatment efficacy, and improve the safety of pest management practices.

The Tech Transfer Program (TTP) in conjunction with the Bee Health Assurance Team (BHAT) has developed a general *Varroa* IPM plan to be used as a guide for beekeepers developing their own IPM plan. One plan does not fit all and, therefore, it is important that beekeepers use this as a template for a personalized *Varroa* IPM plan, making modifications where necessary to meet their specific operational needs. This guide has been based on seasonal changes within Alberta and may not be applicable in warmer climates.

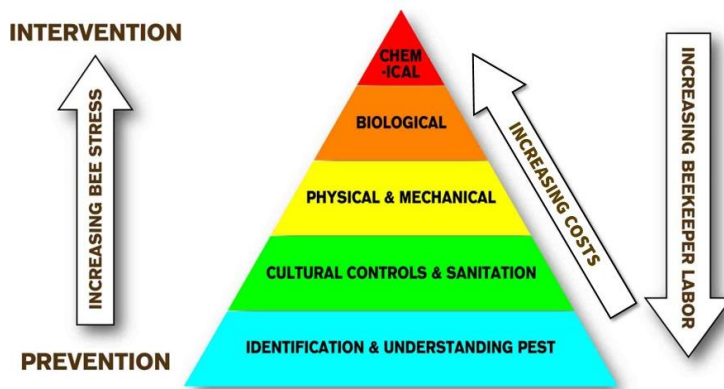


Figure 1. IPM Pyramid.

IPM Pro Tips:

It is strongly recommended that beekeepers always monitor before and after every treatment, especially between organic treatments.

It is recommended that every operation has at least one person designated to carrying out the IPM activities. This allows for a strong focus on disease monitoring.




Move suspected or sick colonies to a hospital yard. This reduces disease transfer to healthy colonies and makes it more convenient to monitor and treat sick colonies in one location.

Colony labels improve disease records and help easily identify problematic hives and apiaries. It is recommended that every colony gets its own unique ID tag.




Frequently check treatment efficacy **DURING** the treatment period. In colder weather use sticky boards to avoid opening the hive; in warmer weather use the mite shaker method.

When using sticky boards, the number of mites dropping should start high and get lower throughout the treatment period. If there is no mite drop then a different treatment method may be required.

SPRING – Late March to April




What	When	How	Action										
Spring Varroa Sampling	BEFORE Treatment & AFTER Treatment	<p>Sampling Parameters Per Operation:</p> <ul style="list-style-type: none"> ▶ Sample <u>ALL apiaries</u> within an operation as mite levels can vary between locations³. <p>Per Apiary:</p> <ul style="list-style-type: none"> ▶ Number of colonies to be monitored is based on apiary size and should be sampled as per the table below. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="text-align: center;">Apiary Size (# of colonies)</td> <td style="text-align: center;">4-9</td> <td style="text-align: center;">10-19</td> <td style="text-align: center;">20-31</td> <td style="text-align: center;">32+</td> </tr> <tr> <td style="text-align: center;"># of colonies to be sampled at random</td> <td style="text-align: center;">3</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">8</td> </tr> </table> <p>Per Colony:</p> <ul style="list-style-type: none"> ▶ A single sample of 300 bees, which is approximately ½ cup of live bees³. <p>Use General Management Inspection Data Sheet</p>	Apiary Size (# of colonies)	4-9	10-19	20-31	32+	# of colonies to be sampled at random	3	5	6	8	<p>Monitoring Varroa Sampling 101</p>  <p>Evaluating Varroa Decision Tree</p>  <p>Intervening Varroa Treatments</p> 
Apiary Size (# of colonies)	4-9	10-19	20-31	32+									
# of colonies to be sampled at random	3	5	6	8									
Economic Threshold: Brood present = 1 mite/100 bees (1% infestation) ²													

SUMMER – May to August

What	When	How	Action										
Monthly Monitoring/ Inspections	May & June & July & August	<p>Sampling Parameters Per Operation:</p> <ul style="list-style-type: none"> ▶ Sample <u>ALL apiaries</u> within an operation as mite levels can vary between locations³. <p>Per Apiary:</p> <ul style="list-style-type: none"> ▶ Number of colonies to be monitored is based on apiary size and should be sampled as per the table below. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="text-align: center;">Apiary Size (# of colonies)</td> <td style="text-align: center;">4-9</td> <td style="text-align: center;">10-19</td> <td style="text-align: center;">20-31</td> <td style="text-align: center;">32+</td> </tr> <tr> <td style="text-align: center;"># of colonies to be sampled at random</td> <td style="text-align: center;">3</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">8</td> </tr> </table> <p>Per Colony:</p> <ul style="list-style-type: none"> ▶ A single sample of 300 bees which, is approximately ½ cup of live bees³. ▶ Inspect for other honey bee diseases on 3 brood frames per brood box⁴. <p>Use General Management & Disease Inspection Data Sheets</p>	Apiary Size (# of colonies)	4-9	10-19	20-31	32+	# of colonies to be sampled at random	3	5	6	8	<p>Evaluating and Intervening Honey Bee Diseases and Pests</p>  <p>Hive-side Guide</p>  <p>Varroa Decision Tree</p> 
Apiary Size (# of colonies)	4-9	10-19	20-31	32+									
# of colonies to be sampled at random	3	5	6	8									
Collecting varroa samples and visual inspection for honey bee diseases													
Economic Threshold: Brood present = 1 mite/100 bees (1% infestation) ²													



Fall – September to October

What	When	How	Action										
Fall Varroa Sampling	BEFORE Treatment	<p>Sampling Parameters Per Operation:</p> <ul style="list-style-type: none"> ▶ Sample <u>ALL apiaries</u> within an operation as mite levels can vary between locations³. <p>Per Apiary:</p> <ul style="list-style-type: none"> ▶ Number of colonies to be monitored is based on apiary size and should be sampled as per the table below. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>Apiary Size (# of colonies)</td> <td>4-9</td> <td>10-19</td> <td>20-31</td> <td>32+</td> </tr> <tr> <td># of colonies to be sampled at random</td> <td>3</td> <td>5</td> <td>6</td> <td>8</td> </tr> </table> <p>Per Colony:</p> <ul style="list-style-type: none"> ▶ A single sample of 300 bees, which is approximately ½ cup of live bees³. <p>Use General Management Inspection Data Sheet</p>	Apiary Size (# of colonies)	4-9	10-19	20-31	32+	# of colonies to be sampled at random	3	5	6	8	<p>Monitoring Varroa Sampling 101</p>  <p>Evaluating Varroa Decision Tree</p>  <p>Intervening Varroa Treatments</p> 
	Apiary Size (# of colonies)		4-9	10-19	20-31	32+							
# of colonies to be sampled at random	3	5	6	8									
&	AFTER Treatment	&											
	REPEAT with every Treatment Cycle												
Economic Threshold: Broodless = 1 mite/100 bees (1% infestation)													

Additional Educational Resources



[AB Tech Transfer Program Website](#)



[Government of Alberta Honey Bee Health and Apiculture](#)



[AB TTP Educational Resources](#)

Supporting Literature:

¹Jack, C. J., & Ellis, J. D. (2021). Integrated pest management control of Varroa destructor (Acari: Varroidae), the most damaging pest of (Apis mellifera L.(Hymenoptera: Apidae)) colonies. *Journal of Insect Science*, 21(5), 6. <https://doi.org/10.1093/jisesa/ieab058>

²Currie, R. (2008). *Economic Threshold for Varroa on the Canadian Prairies*. University of Manitoba, Dept. of Entomology, Winnipeg Manitoba. <https://capabees.com/shared/2013/02/varroathreshold.pdf>

³Lee, K. V., Moon, R. D., Burkness, E. C., Hutchison, W. D., & Spivak, M. (2010). Practical sampling plans for Varroa destructor (Acari: Varroidae) in Apis mellifera (Hymenoptera: Apidae) colonies and apiaries. *Journal of Economic Entomology*, 103(4), 1039-1050. <https://doi.org/10.1603/EC10037>

⁴Goodwin, M., & Eaton, C. V. (1999). *Elimination of American foulbrood without the use of drugs: a practical manual for beekeepers*. National Beekeepers' Association of New Zealand, Inc.