



# The Russian Honey Bee Program

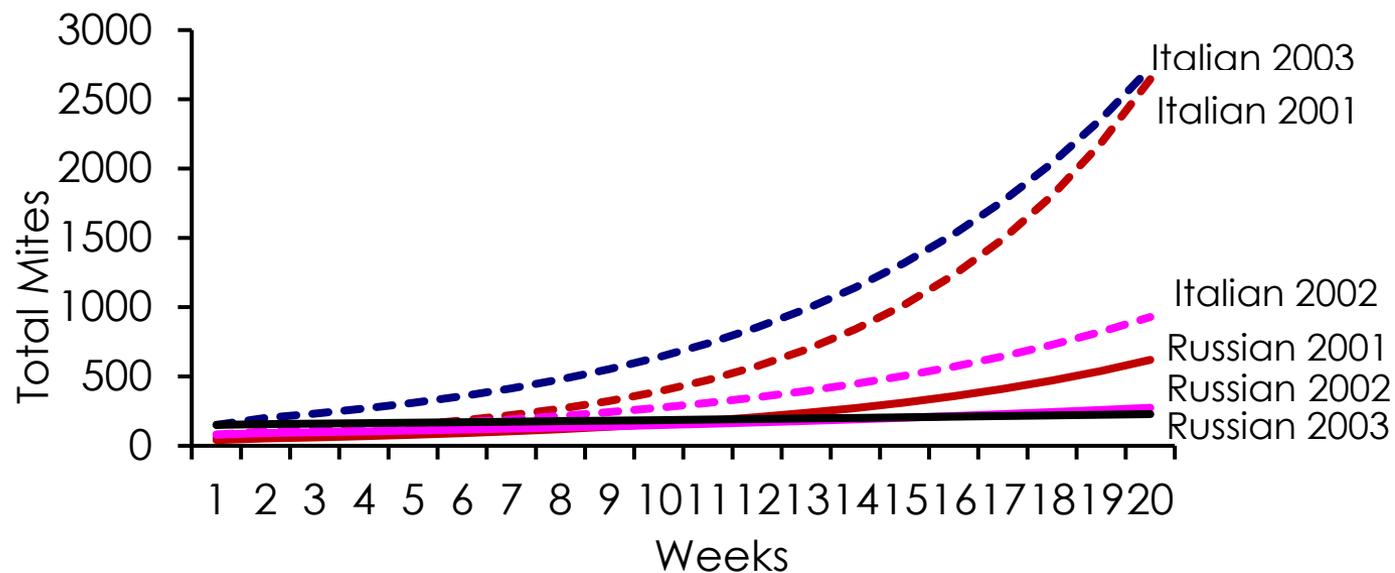
**An update  
since the  
stock's release  
in 2008**

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**Honey Bee Breeding, Genetics  
and Physiology Laboratory**



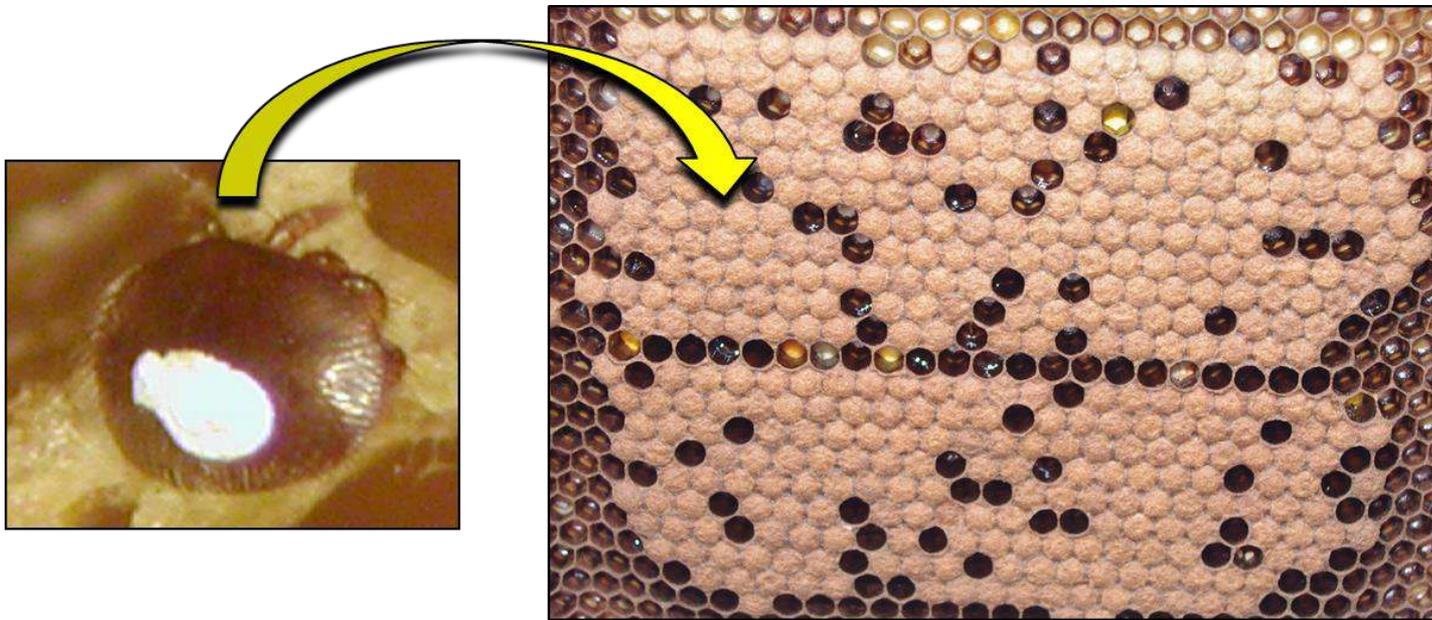
# Slow Mite Population Growth in Russian Bees



Multitude of mechanisms are involved.



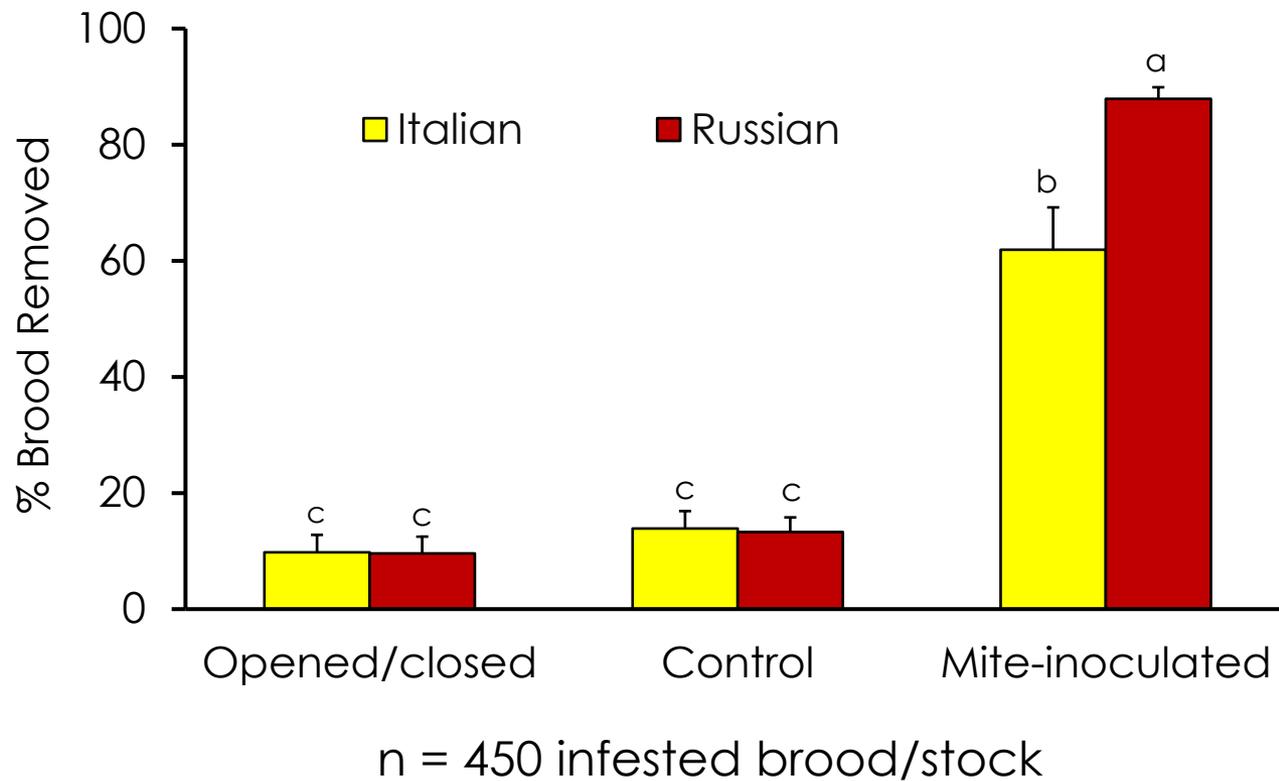
# Removal of Infested Brood and Mite Drop



**Marked *Varroa* were used to ensure that mites on traps were mites from the infested brood.**

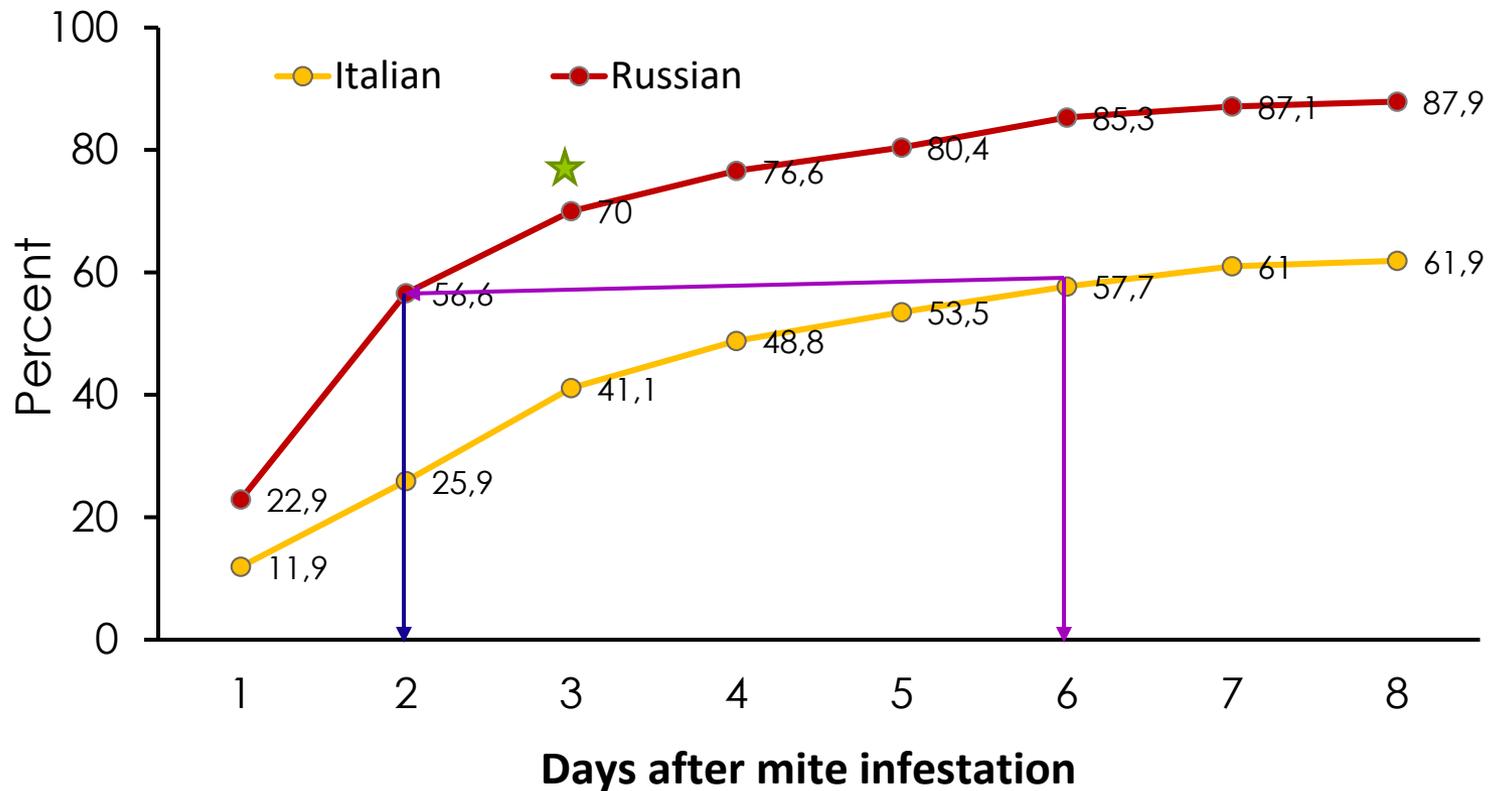


# Strong response to infested brood by Russian bees

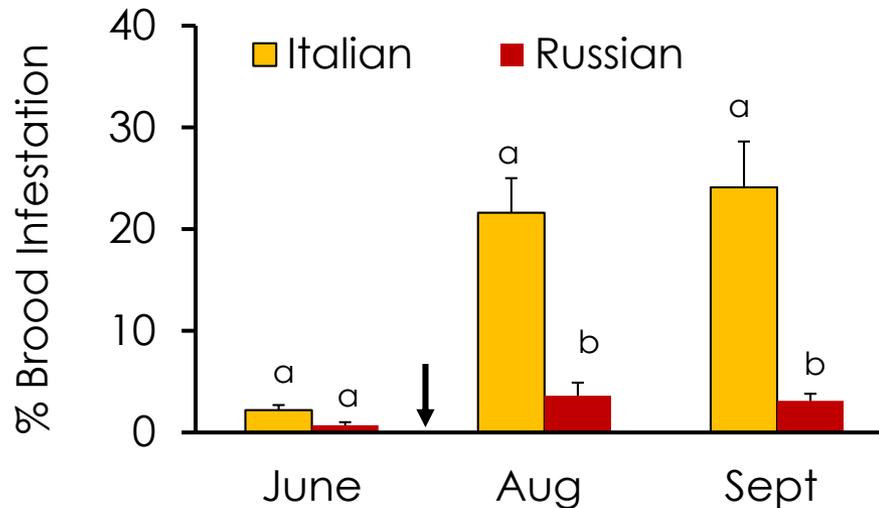
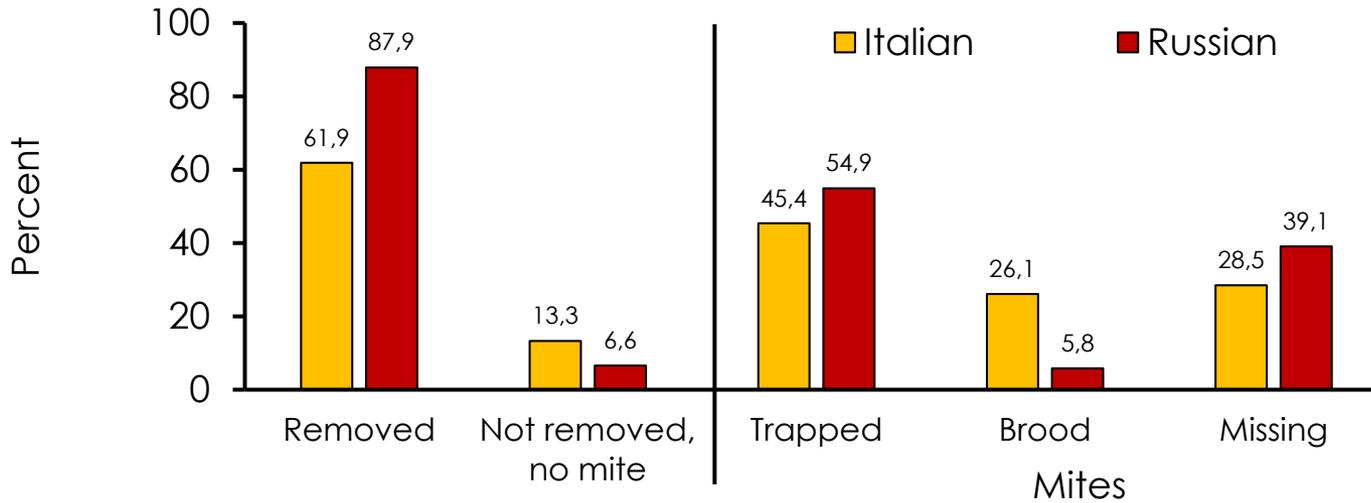




# Rapid response to infested brood by Russian bees



# Fate of Exposed Mites

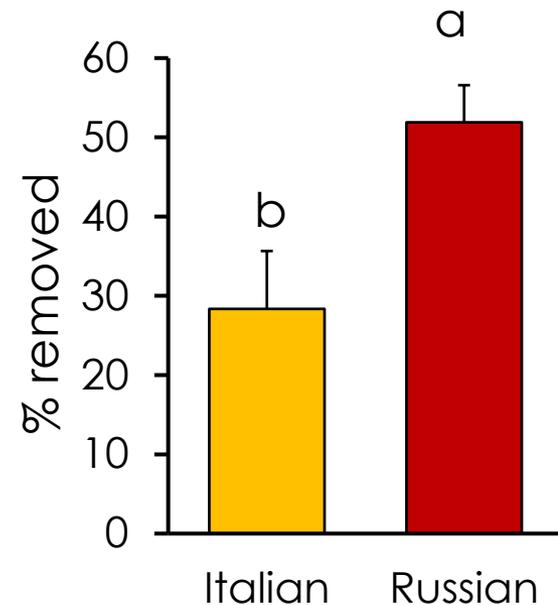




# VSH activity and Mite Drop

## Treatment Groups:

- 🐝 Russian, high hygiene (>70%)
- 🐝 Russian, medium hygiene (35-70%)
- 🐝 Russian, low hygiene (<35%)
- 🐝 Italian, 5-72% (control)





# Laboratory Bioassay





# Behavioral Assay

	Bee Group			
Measurements	RHB, low <35%	RHB, med 35-70%	RHB, high >70%	IHB 5-72%
Latency (sec) <sup>ns</sup>	18.9 ± 2.0	21.2 ± 3.1	19.2 ± 2.2	21.8 ± 1.4
Duration (%)	7.7 ± 0.8 <sup>b</sup>	9.4 ± 1.2 <sup>ab</sup>	10.5 ± 0.8 <sup>a</sup>	7.7 ± 0.8 <sup>b</sup>

n = 780 mites



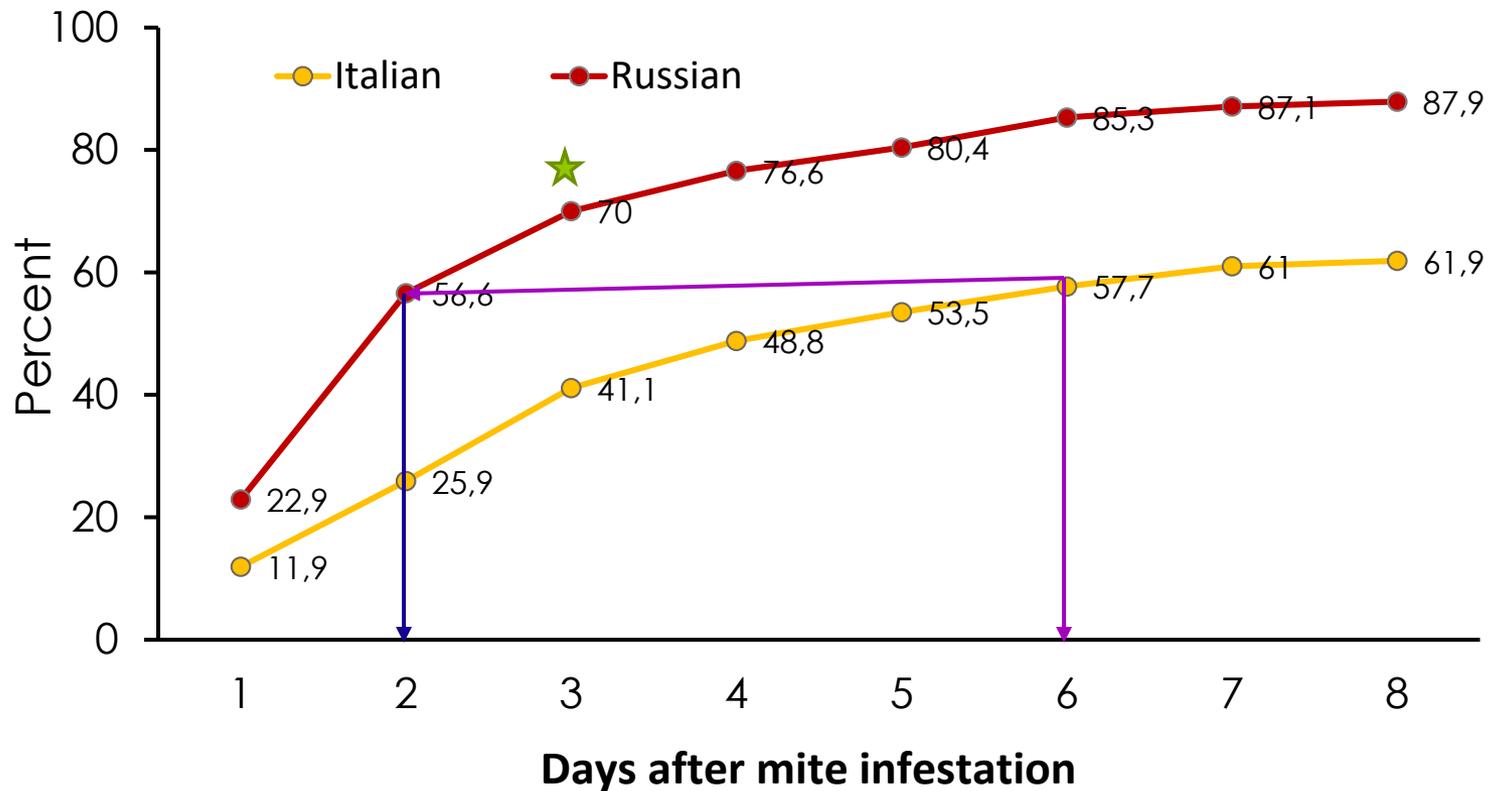
# Colony Level Mite Drop

Grooming Measurements	Bee Group			
	RHB, low <35%	RHB, med 35-70%	RHB, high >70%	IHB 5-72%
Old/trapped mites, O/T	58.1±3.4 <sup>b</sup>	74.1±6.1 <sup>a</sup>	74.0±5.3 <sup>a</sup>	60.3±6.6 <sup>b</sup>
Young/trapped mites, Y/T	41.5±3.6 <sup>a</sup>	25±5.8 <sup>b</sup>	25.1±5.3 <sup>b</sup>	37.3±5.8 <sup>a</sup>
Injured/trapped mites, I/T <sup>ns</sup>	17.9±3.3	16.1±4.3	19.8±4.1	24.3±3.5
Fresh/trapped mites, F/T	60.9±4.8 <sup>ab</sup>	70.3±4.9 <sup>a</sup>	66.2±4.1 <sup>a</sup>	55.7±1.6 <sup>b</sup>
Injured fresh/fresh mites, IF/F <sup>ns</sup>	2.96±1.2	3.6±2.8	3.8±2.1	2.4±1.1

- 🐝 O/T – positive correlation with VSH activity in RHBs only.
- 🐝 Y/T – negative correlation with VSH activity in RHBs only.



# Rapid response to infested brood by Russian bees



# Summary

-  Mite drop is heavily influenced by hygienic behaviour.
-  Younger mites - indication of successful mite reproduction.
-  Older mites - indicator of active mite removal.



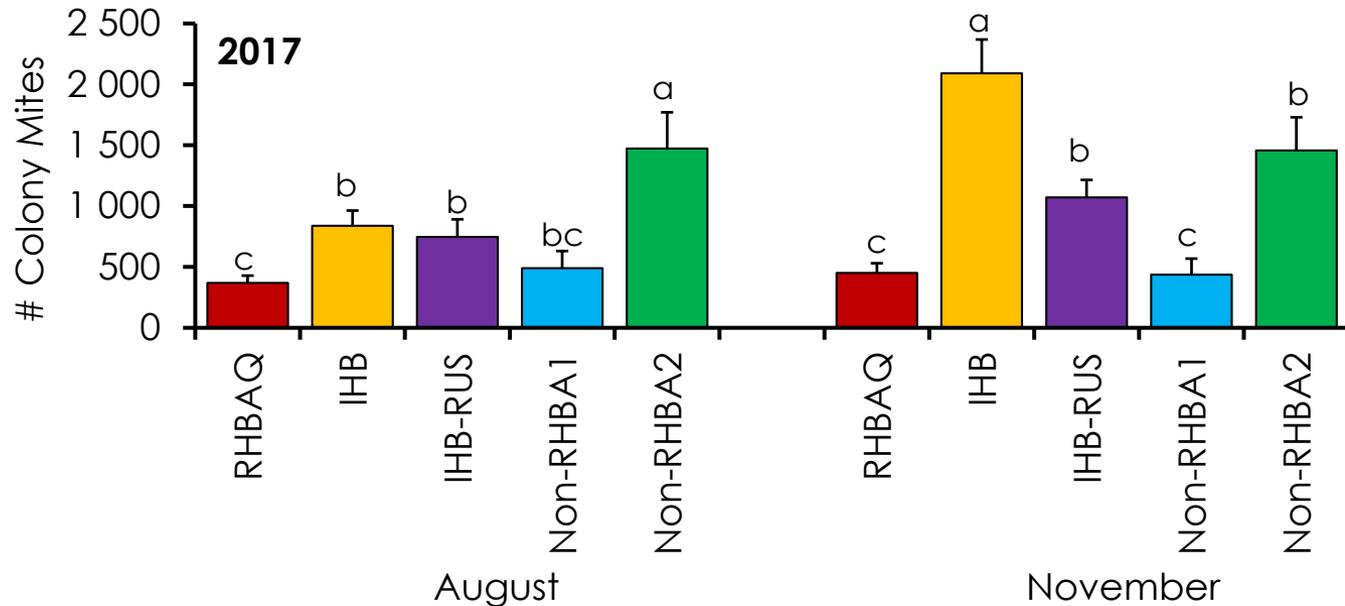
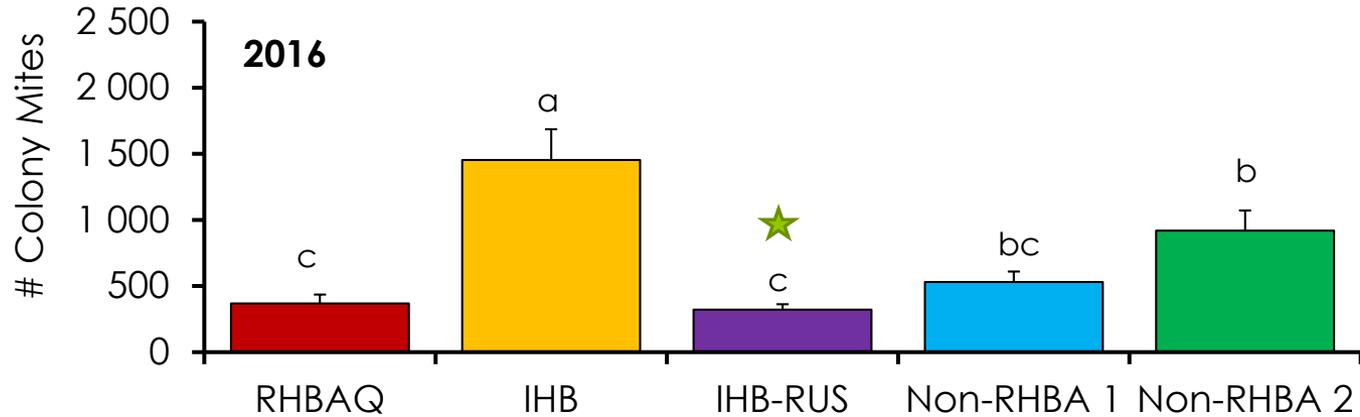
# Re-evaluation of RHBs (2016-2017)

- 🐝 Russian - produced by RHBA (RHBAQ)
- 🐝 Italian - IHB
- 🐝 Italian mated with Russian drones (IHB x RHB)
- 🐝 Non-RHBA1 - advertised as Primorsky Russian
- 🐝 Non-RHBA2 - advertised as Russian/Italian hybrid





# Number of Mites in the Colonies





# Summary

- 🐝 RHB consistently had low mite populations.
- 🐝 RHBA achieved its breeding mission.
- 🐝 Not all Russian hybrids have equal varroa resistance.
- 🐝 Improved resistance in IHB mated with selected Russian drones





# Russian Honeybee Breeders Association, Inc.

<http://www.russianbreeder.org>

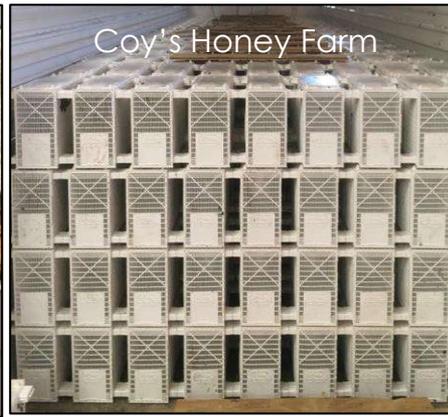
 13 members; 500-12,000 colonies/member



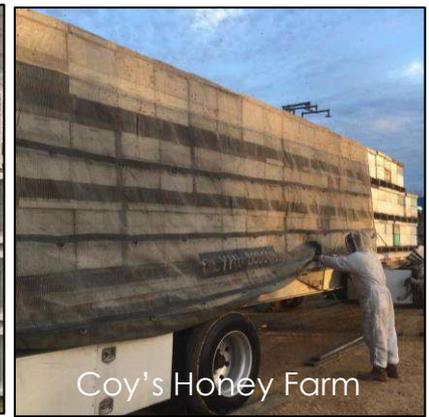
Coy Bee Company



Coy's Honey Farm



Coy's Honey Farm



Coy's Honey Farm



Smith Honey Farm

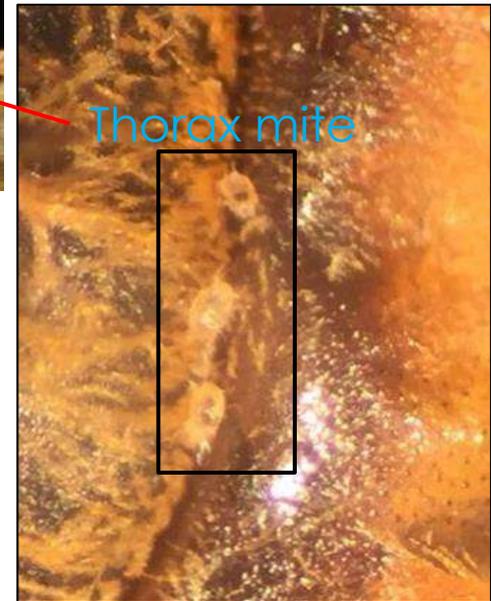
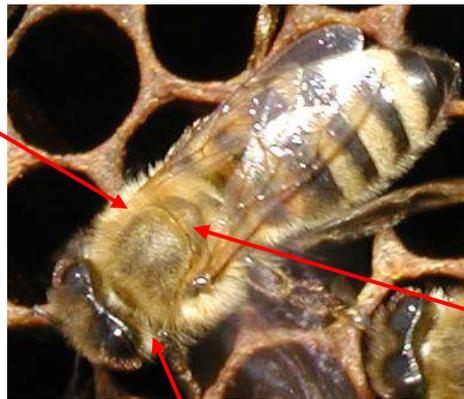


# Acarapis Complex



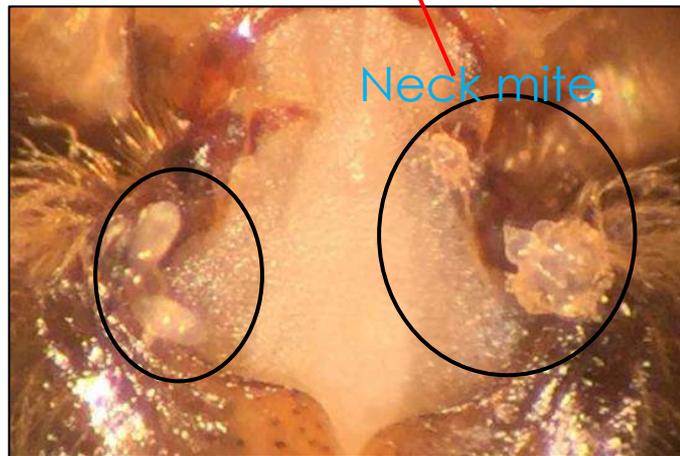
Tracheal mite

*Acarapis woodi*



Thorax mite

*Acarapis dorsalis*

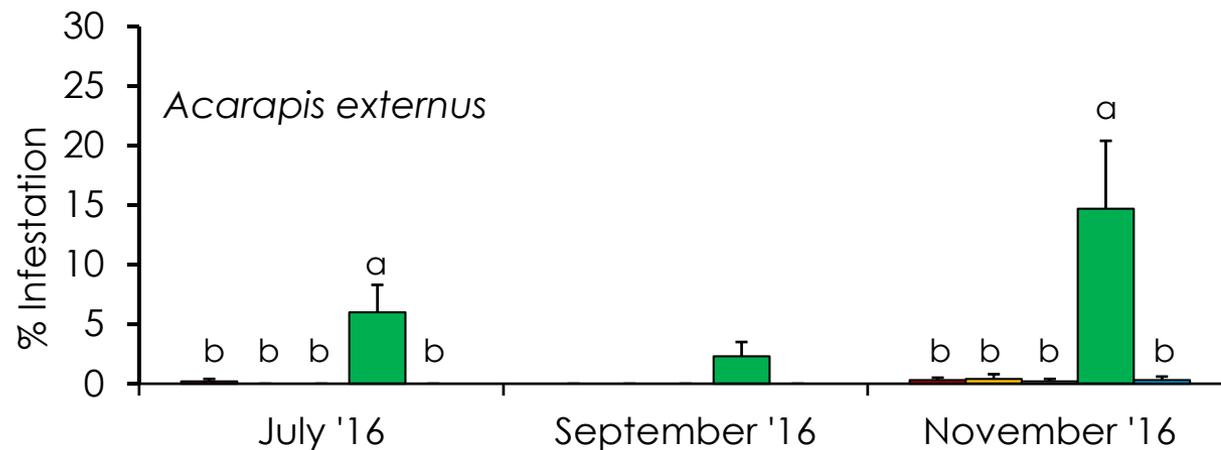
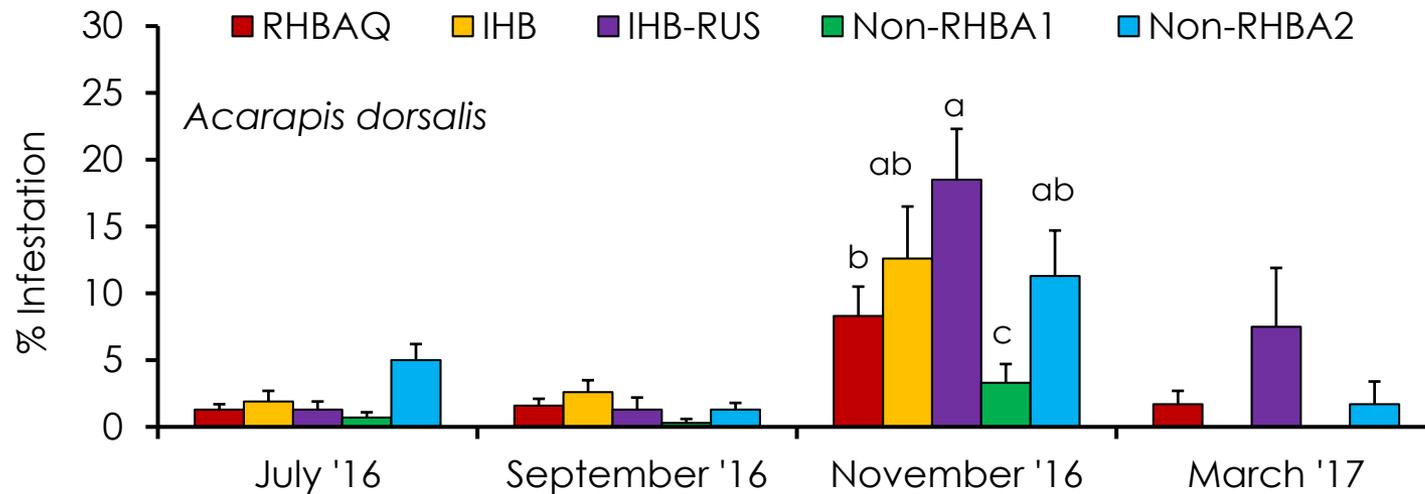


Neck mite

*Acarapis externus*

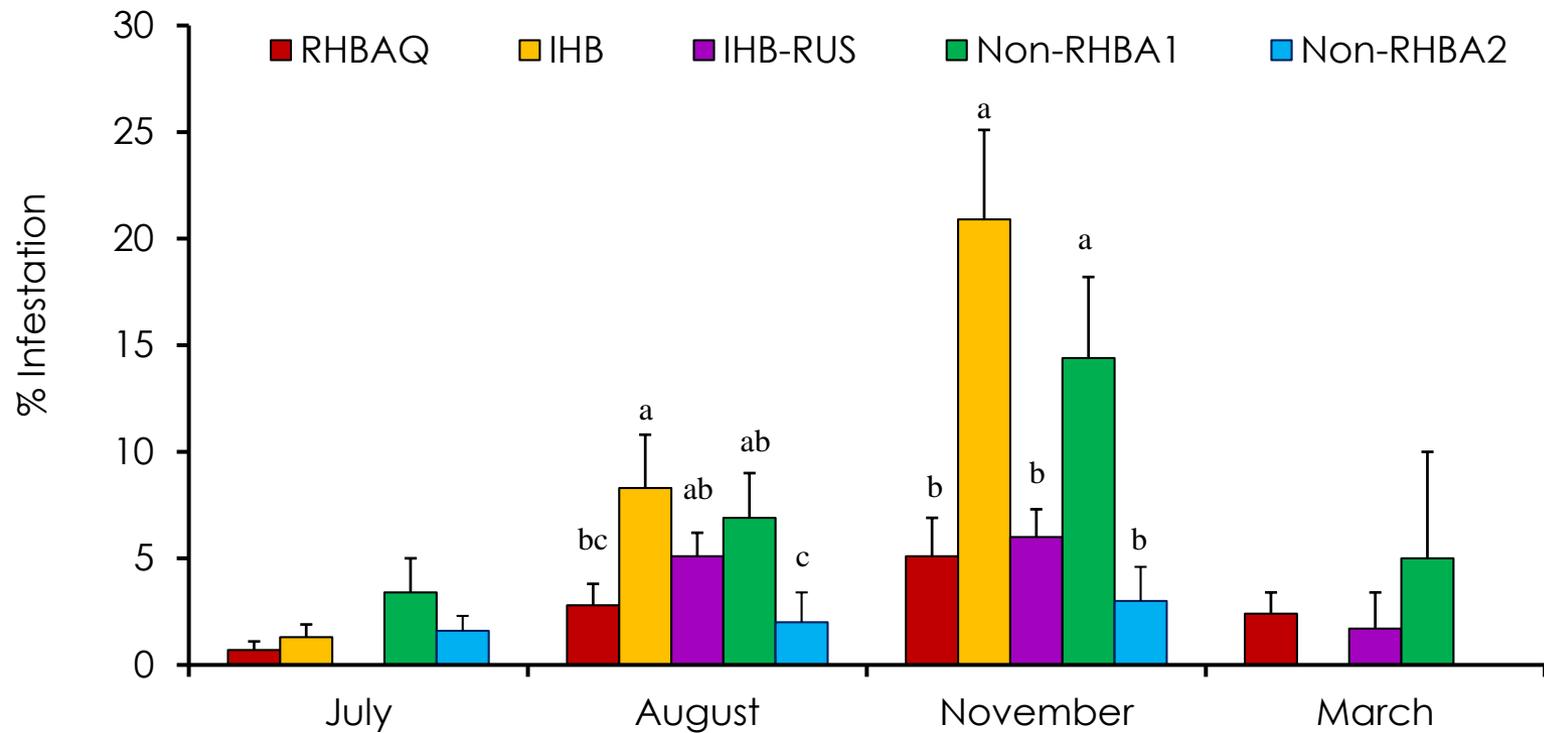


# External *Acarapis* Infestation





# *Acarapis dorsalis* Infestation (2017)





United States Department of Agriculture



## Acknowledgements

-  Thomas Rinderer
-  Maria Kirrane
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-  Tony Stelzer
-  Gary Delatte
-  Josh Wales

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