



The Russian Honey Bee Program

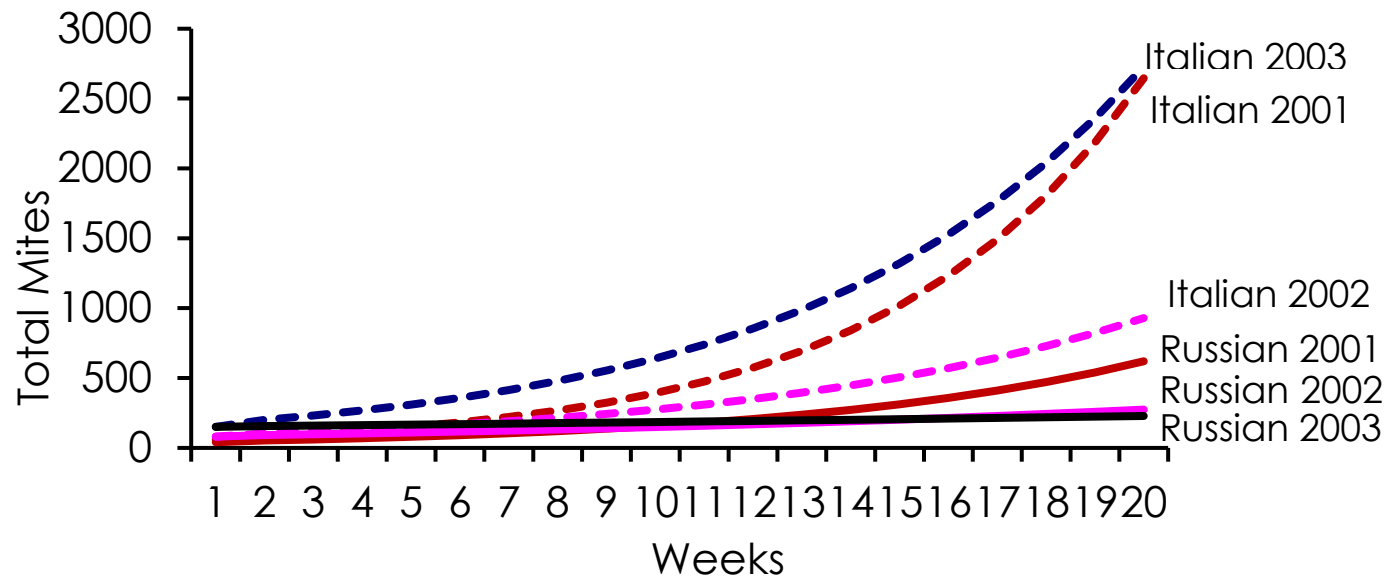
**An update
since the
stock's release
in 2008**

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and Physiology Laboratory**

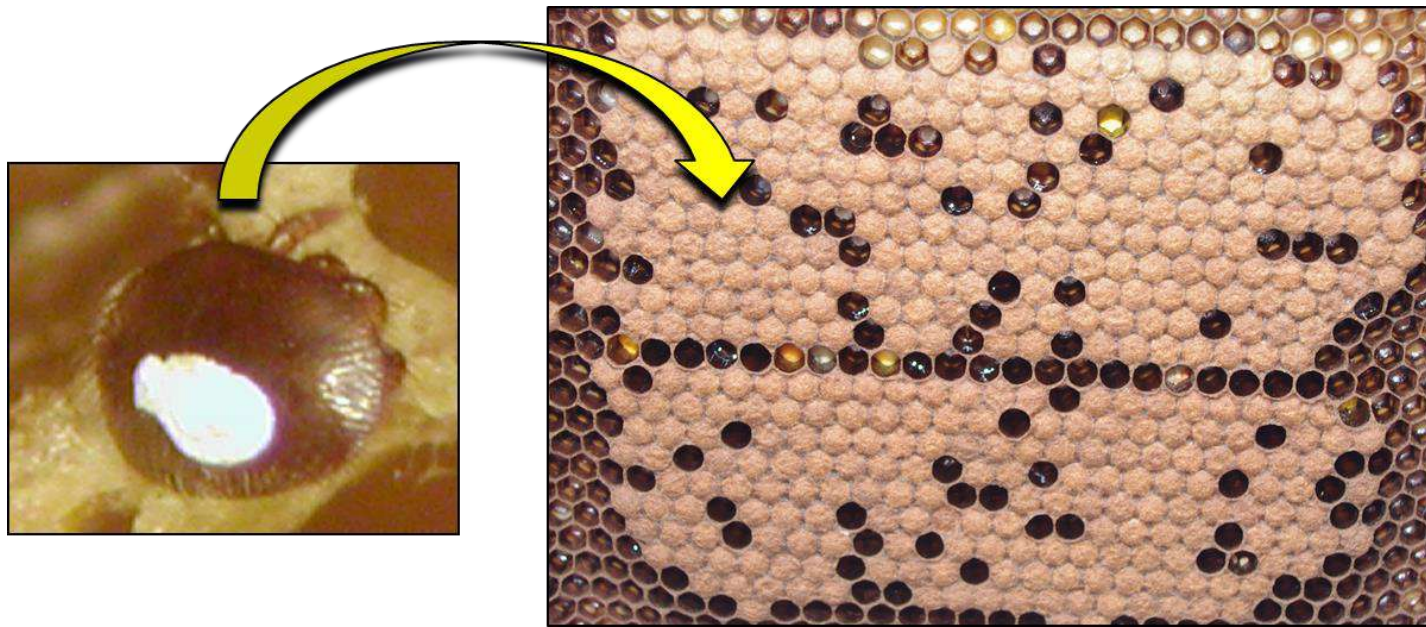


Slow Mite Population Growth in Russian Bees



Multitude of mechanisms are involved.

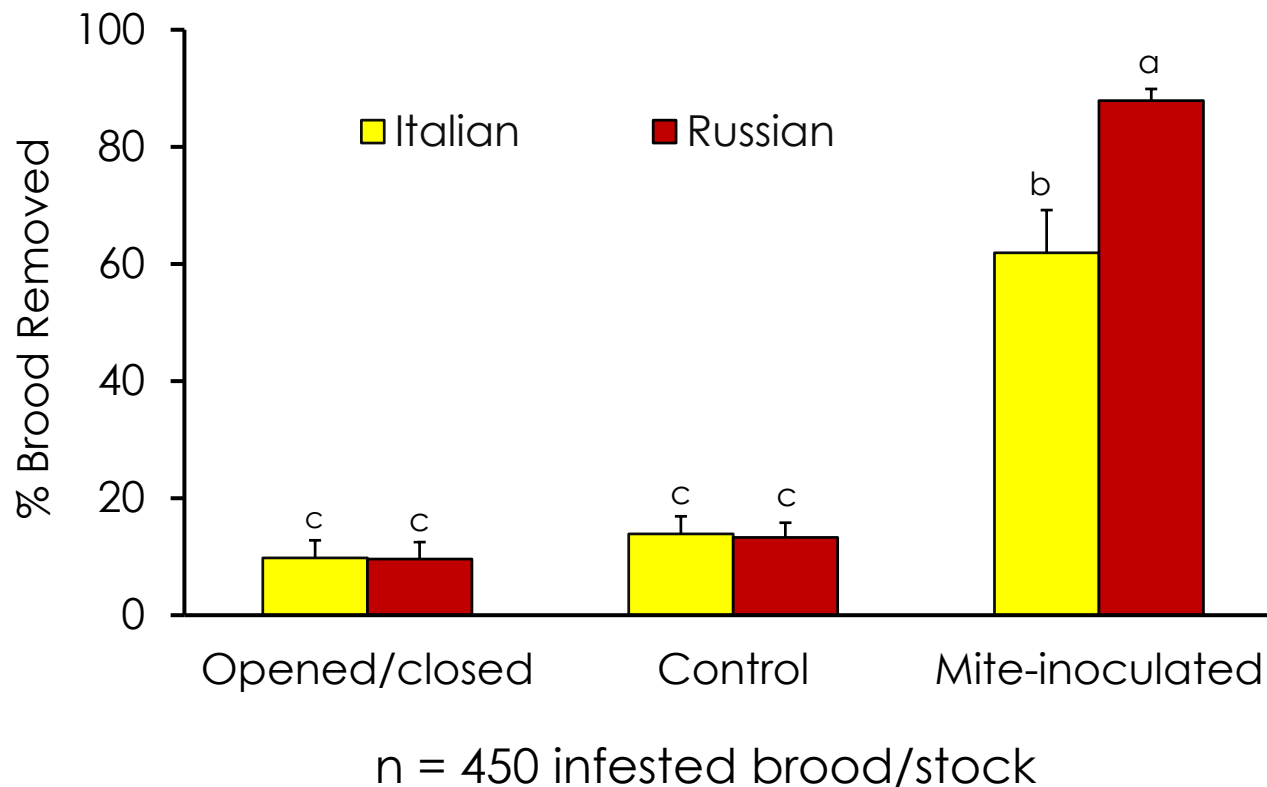
Removal of Infested Brood and Mite Drop



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

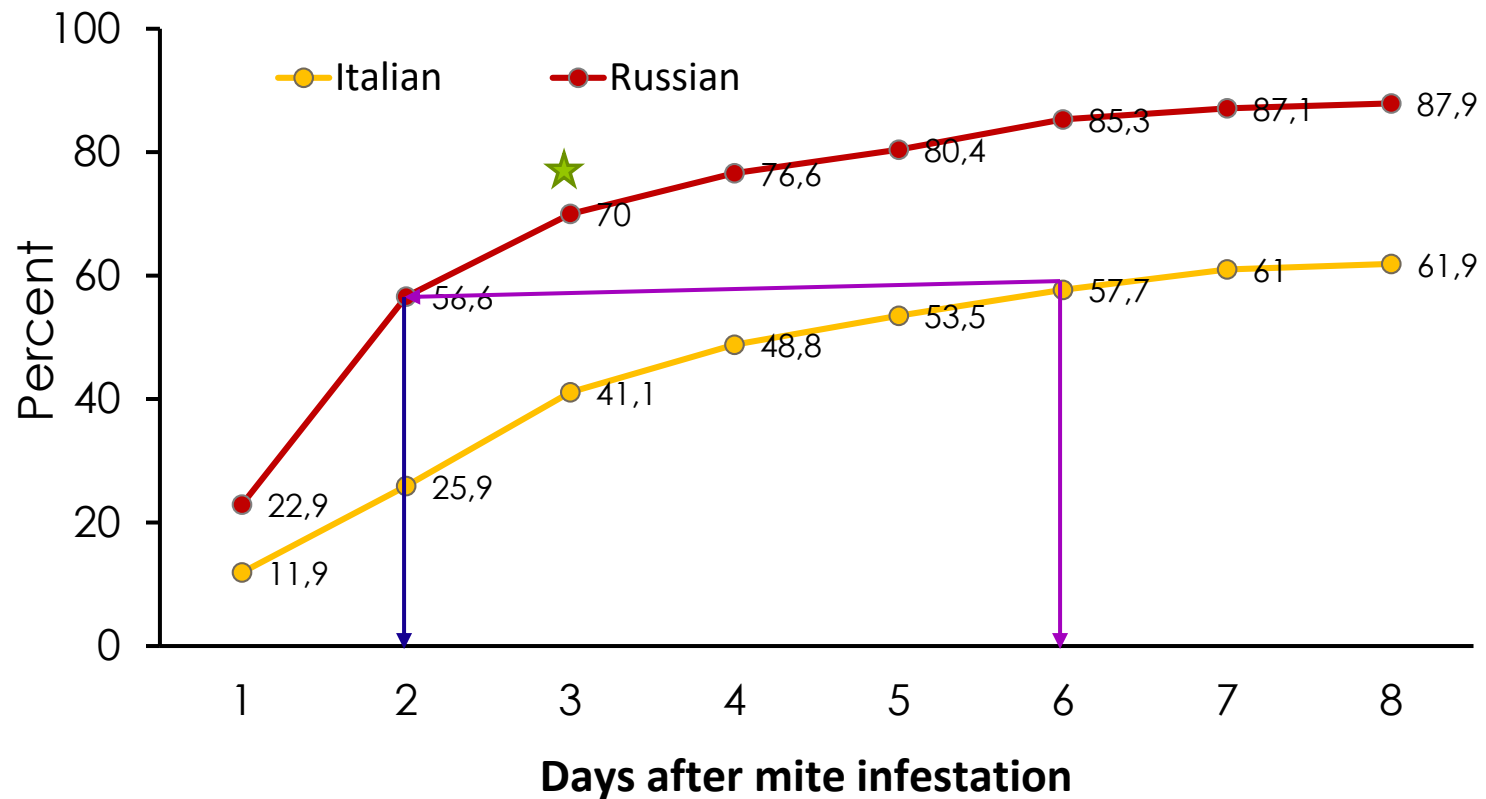


Strong response to infested brood by Russian bees

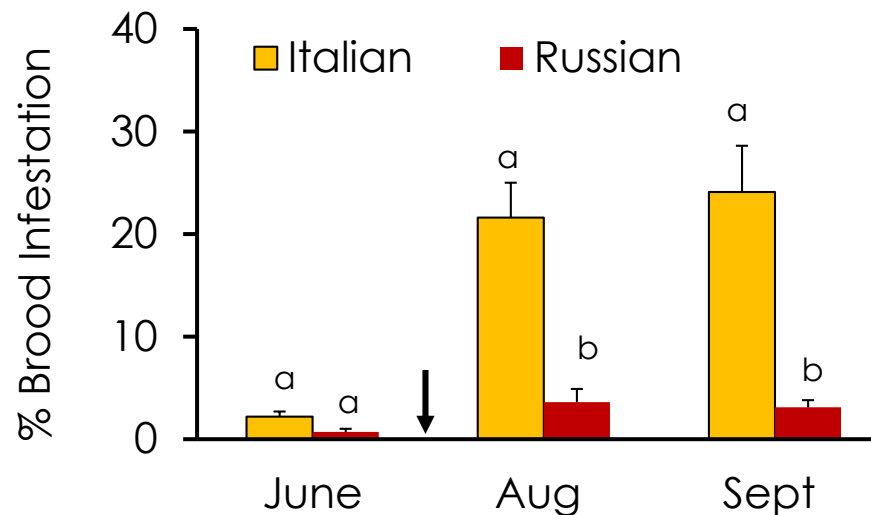
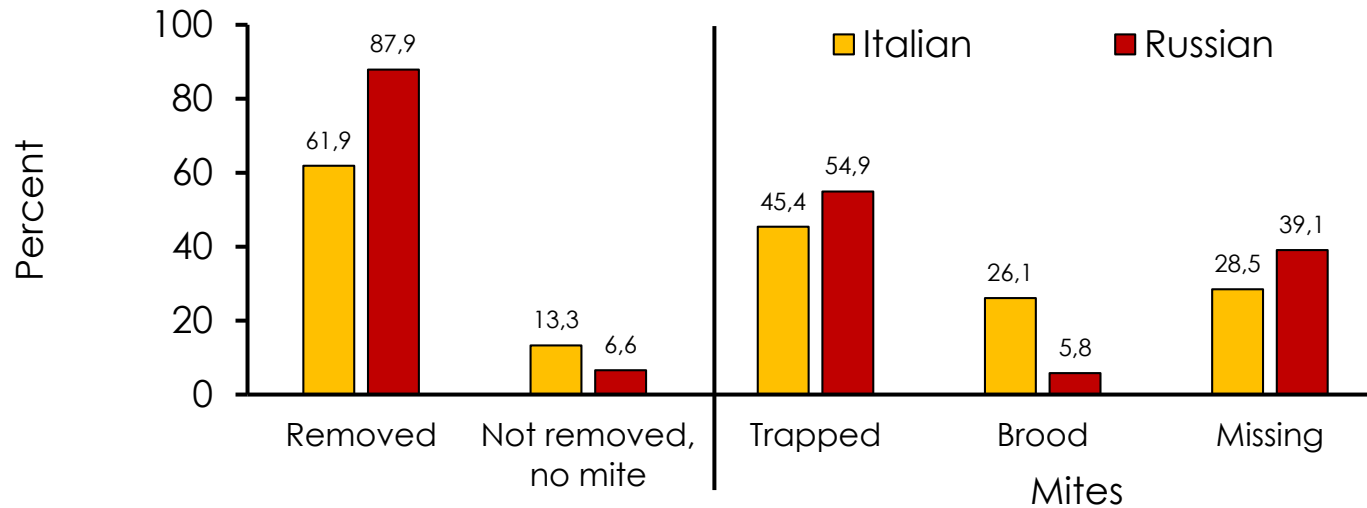
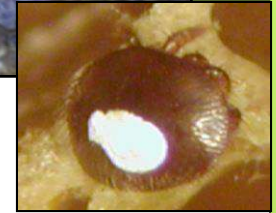




Rapid response to infested brood by Russian bees



Fate of Exposed Mites



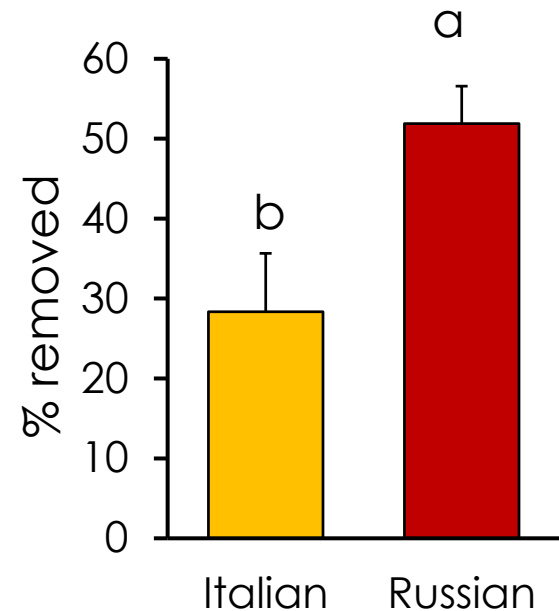
de Guzman et al. 2016



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) ^{ns}	18.9 ± 2.0	21.2 ± 3.1	19.2 ± 2.2	21.8 ± 1.4
Duration (%)	7.7 ± 0.8 ^b	9.4 ± 1.2 ^{ab}	10.5 ± 0.8 ^a	7.7 ± 0.8 ^b

n = 780 mites



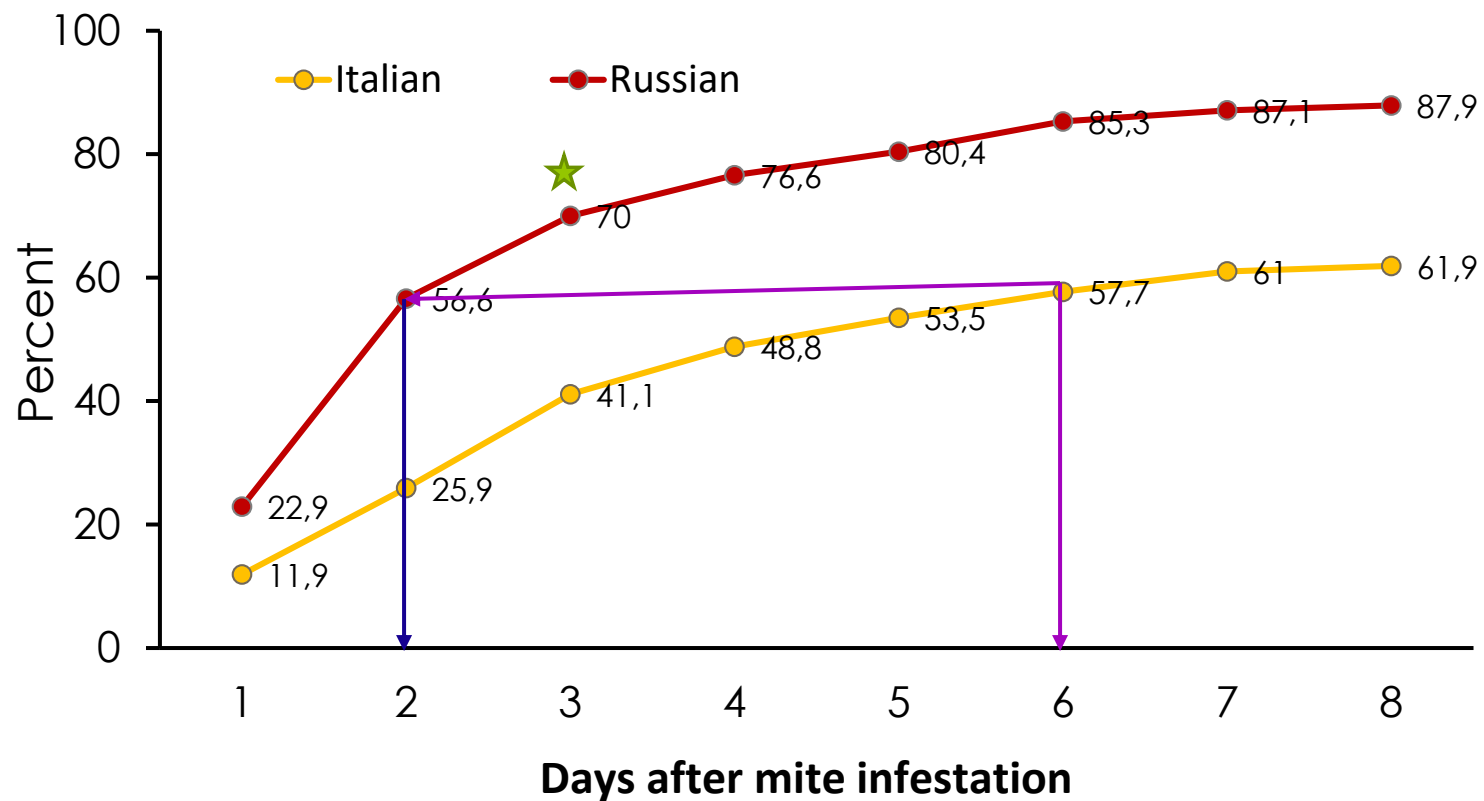
Colony Level Mite Drop

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 ^b	74.1±6.1 ^a	74.0±5.3 ^a	60.3±6.6 ^b
Young/trapped mites, Y/T	41.5±3.6 ^a	25±5.8 ^b	25.1±5.3 ^b	37.3±5.8 ^a
Injured/trapped mites, I/T ^{ns}	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 ^{ab}	70.3±4.9 ^a	66.2±4.1 ^a	55.7±1.6 ^b
Injured fresh/fresh mites, IF/F ^{ns}	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.



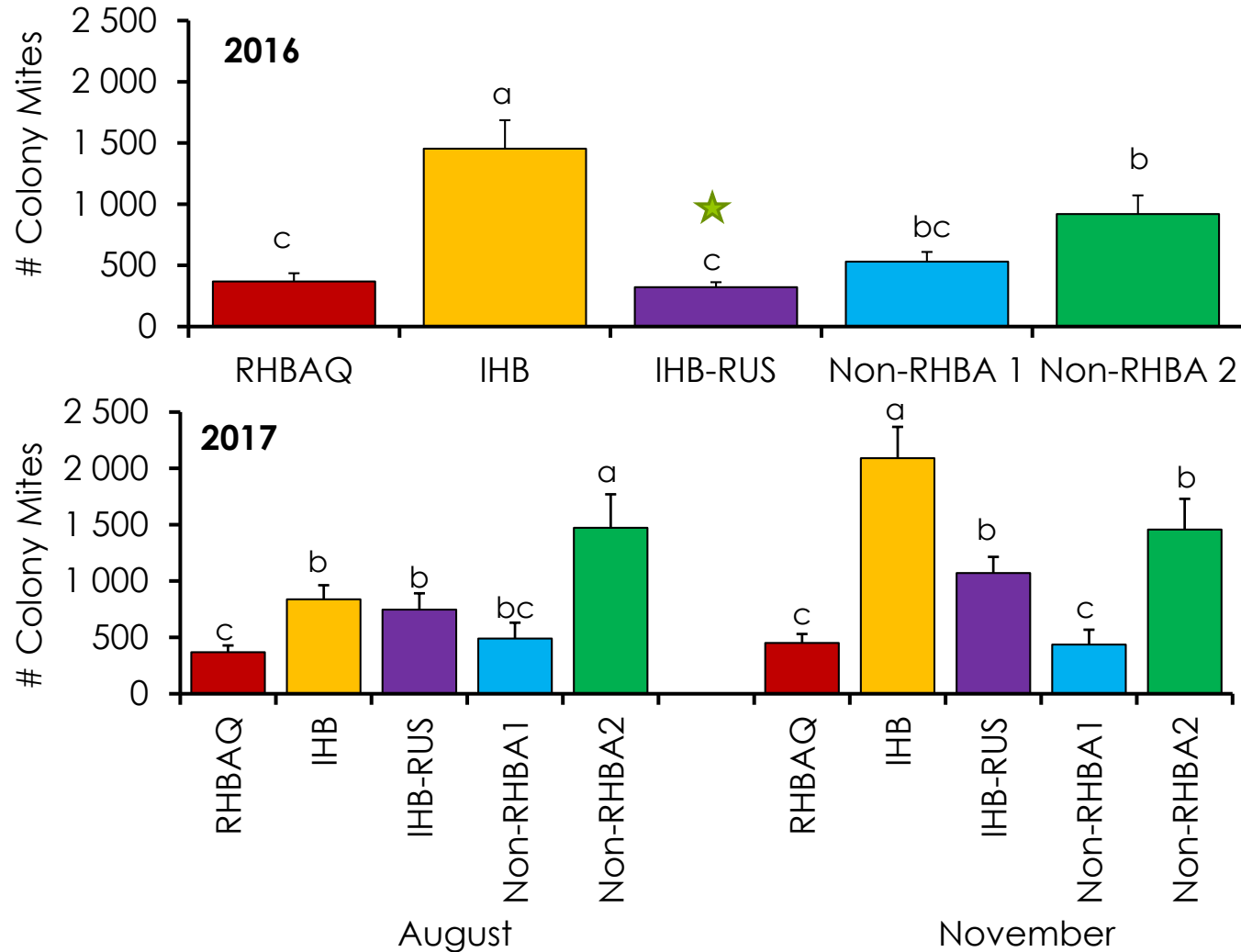
Re-evaluation of RHBs (2016-2017)

- 🐝 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



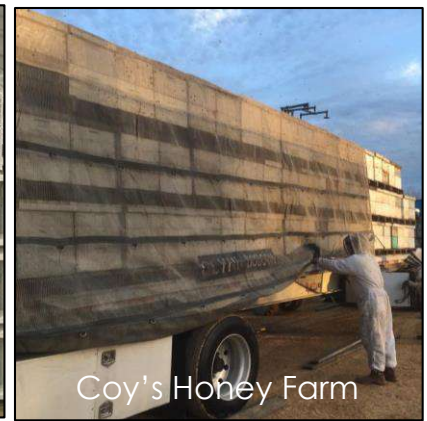
Coy Bee Company



Coy's Honey Farm



Coy's Honey Farm



Coy's Honey Farm



Smith Honey Farm

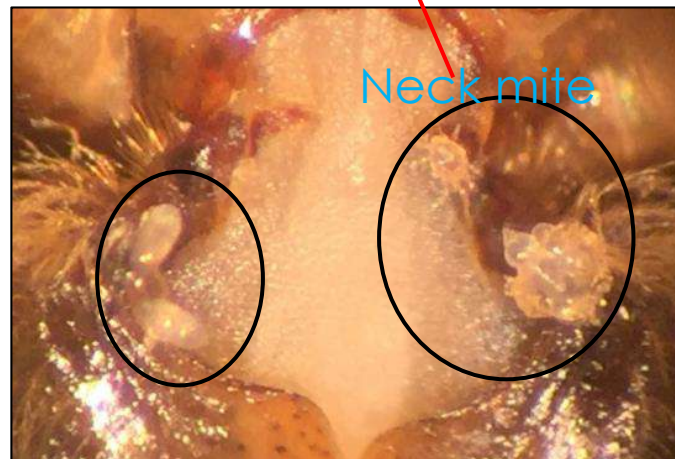
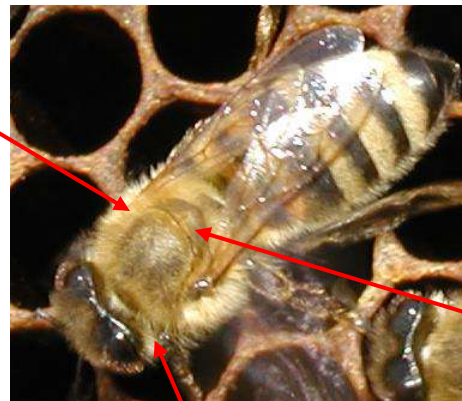


Acarapis Complex



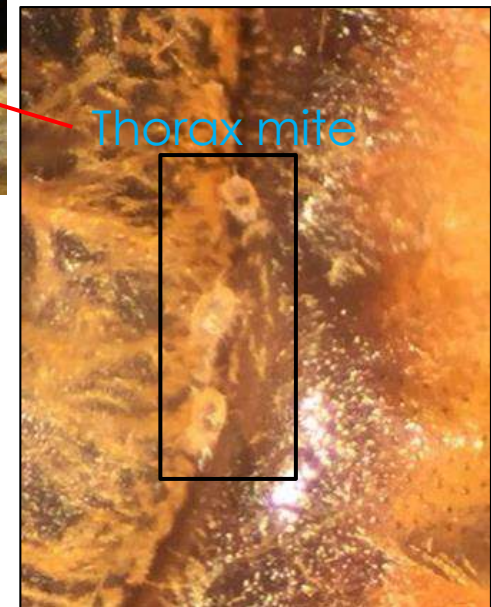
Tracheal mite

Acarapis woodi



Neck mite

Acarapis externus

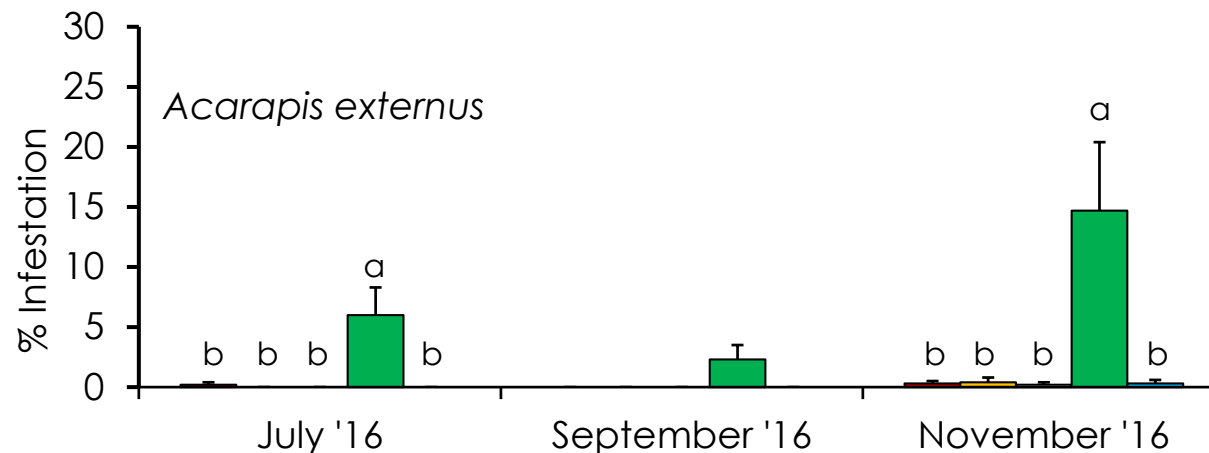
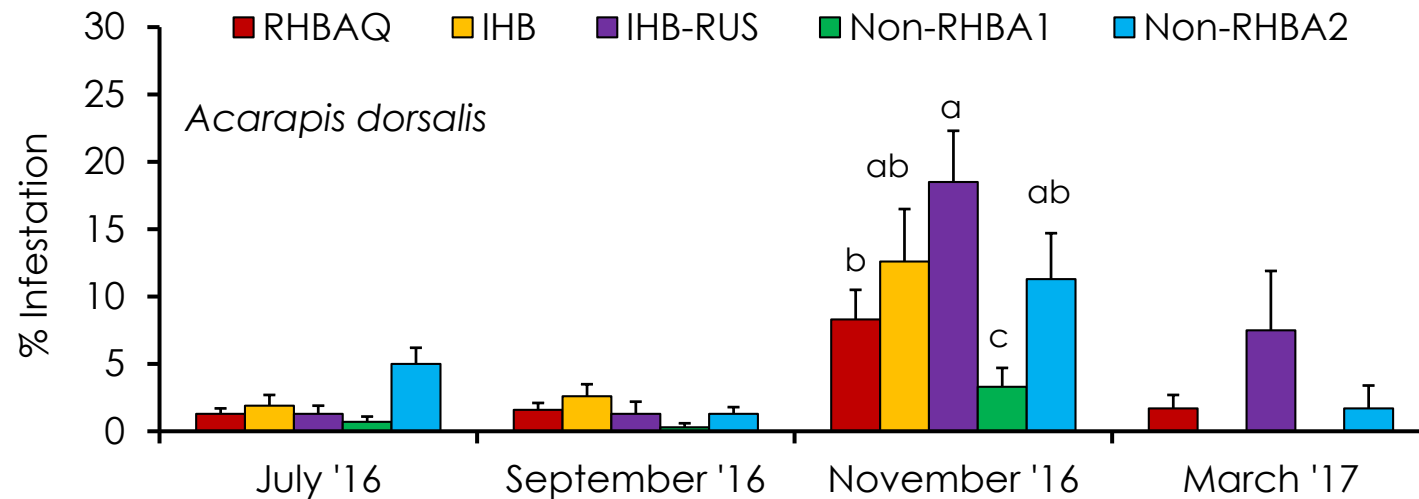


Thorax mite

Acarapis dorsalis

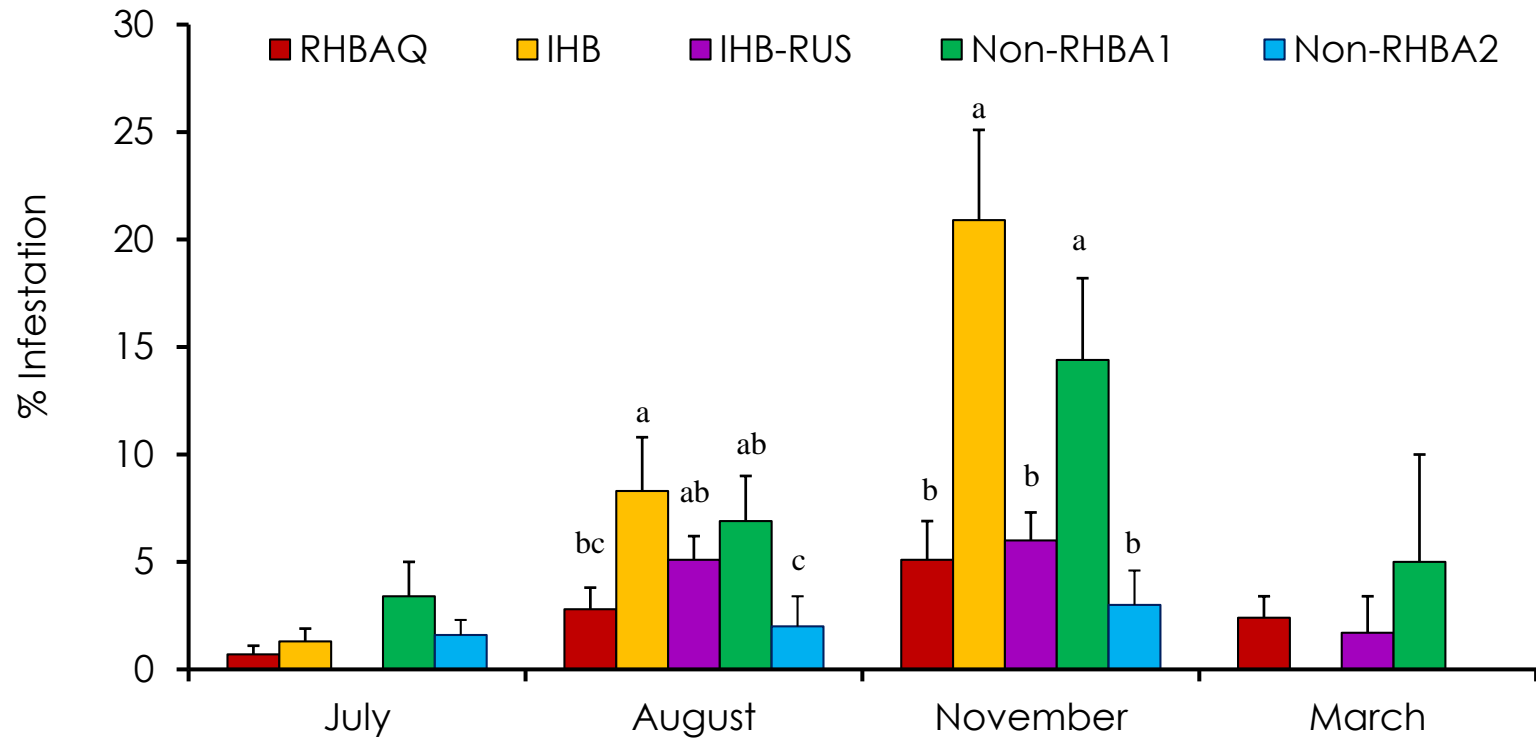


External *Acarapis* Infestation





Acarapis dorsalis Infestation (2017)













United States Department of Agriculture



Acknowledgements

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