

Analyzing *Solanum sisymbriifolium* for nematicidal compounds against plant parasitic nematodes

K.O. Chandler¹, L. Schulz², H. Baker², I. Popova³, L.M. Dandurand², I.A. Zasada⁴, and C. Gleason¹

¹Department of Plant Pathology, Washington State University, Pullman, WA 99164, cynthia.gleason@wsu.edu.

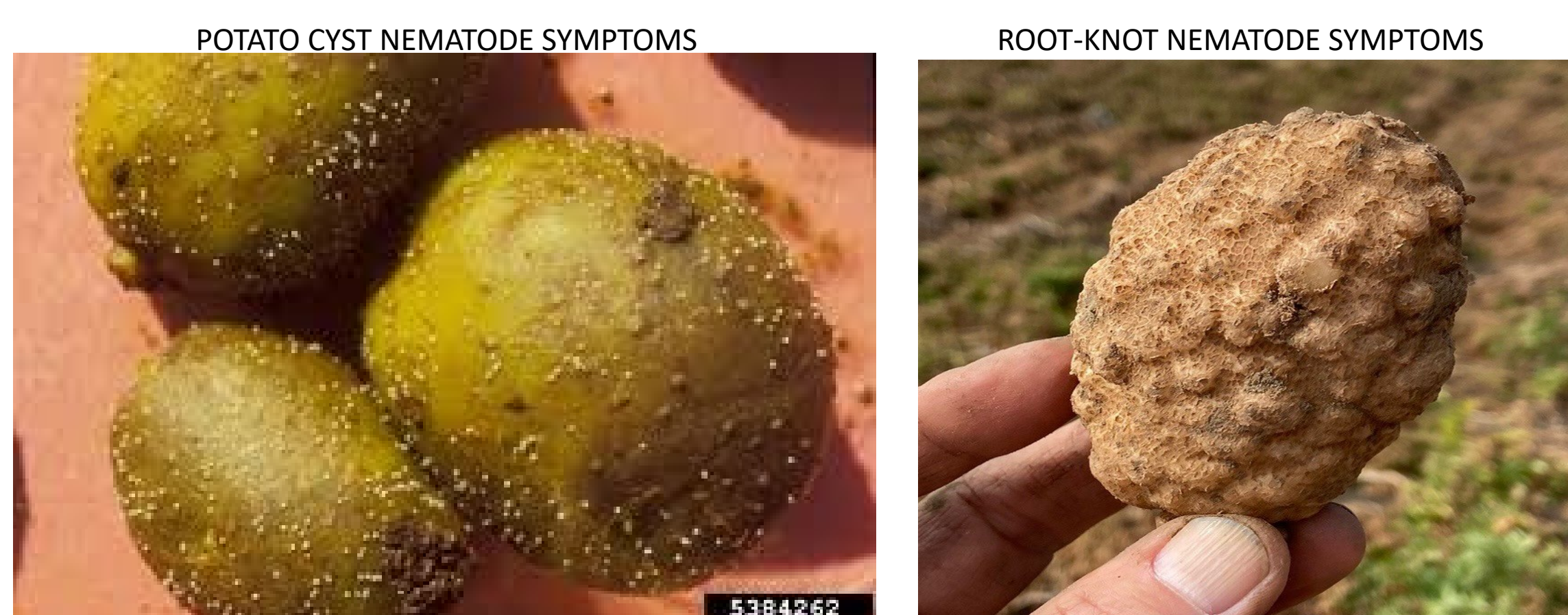
²Department of Entomology, Plant Pathology, and Nematology, University of Idaho, Moscow, ID 83844

³Department of Soil Science, University of Wisconsin-Madison, Madison, WI 53706

⁴NemaSolutions LLC., Corvallis, OR 97330

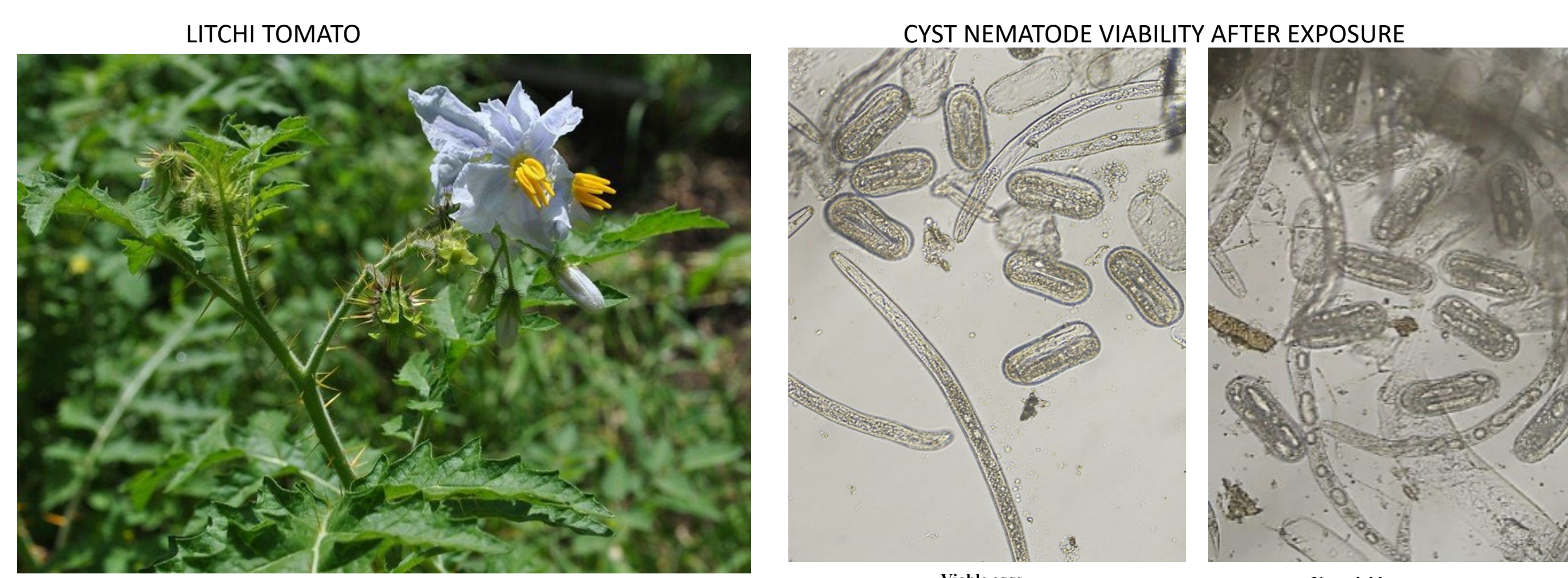
The problem - nematodes

Nematodes cause \$300–500/acre in potato losses, with root-knot nematodes (*Meloidogyne hapla*, *M. chitwoodi*) widespread in the Pacific Northwest and potato cyst nematode (*Globodera pallida*, *Globodera rostochiensis*), a quarantine pest with limited distribution (Idaho and NY, respectively), threatening the US potato industry.



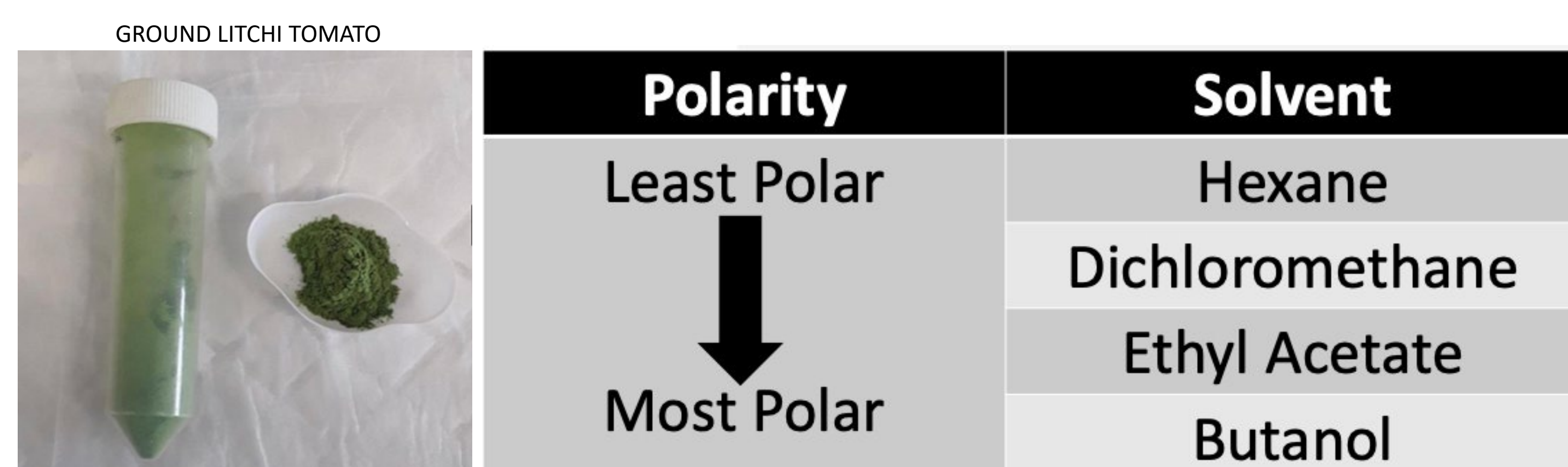
The solution – “Litchi tomato”

Solanum sisymbriifolium Sis Syn II, also known as litchi tomato, a wild relative of potato. Litchi tomato is very resistant to root-knot nematodes and cyst nematodes. Extracts are known to stimulate hatch, but they also kills nematode eggs and juveniles.



What makes litchi tomato toxic to nematodes?

Litchi stem and leaves were collected, freeze dried, and subjected to chemical extraction using four solvents that vary in polarity. Each solvent will extract different compounds from litchi tomato. The extracts were resuspended in water and used to test nematode egg hatching and viability.



Litchi tomato extracts are toxic to potato cyst nematodes

Treatment	No dilution	percentage hatch
Stem/leaf	PRD	72%
	BRD	12%
	Hexane	39%
	Dichloromethane	64%
	Ethyl acetate	66%
	1-Butanol	24%

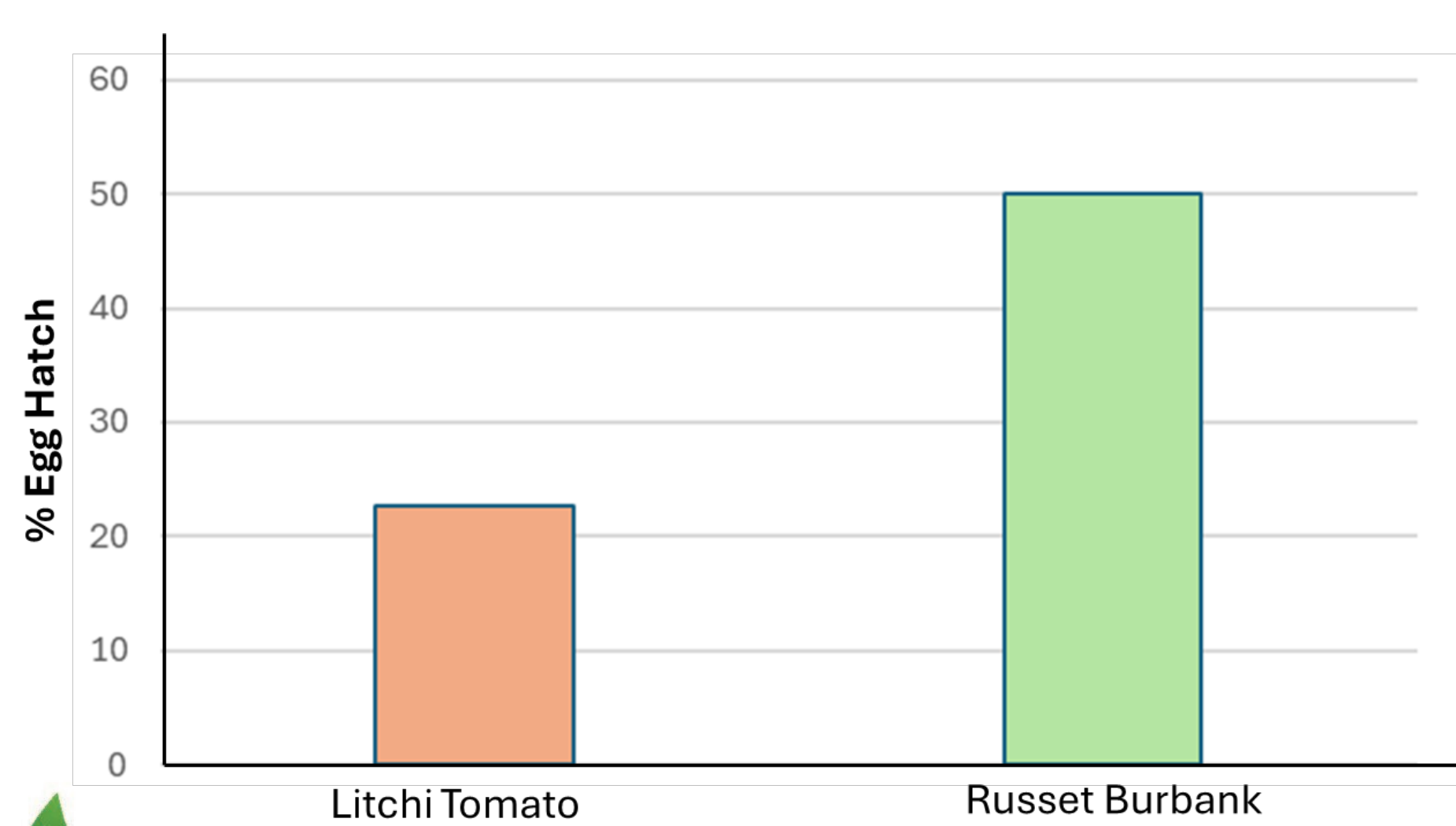
Litchi tomato extracts were made from 8-wk-old plant tissues and were extracted with hexane, dichloromethane, ethyl acetate, or 1-butanol. They were dissolved in potato root diffusate (PRD). Egg hatching was inhibited when *G. pallida* was exposed to the non-diluted 1-butanol and hexane extracts.

Litchi tomato extracts are toxic to root-knot nematodes

Treatment	1:05	percentage hatch
Stem/leaf	water	24%
	Hexane	13%
	Dichloromethane	9.10%
	Ethyl acetate	2.60%
	1-Butanol	2.30%

Litchi tomato extracts were made from 8-wk-old plant tissues and were extracted with hexane, dichloromethane, ethyl acetate, or 1-butanol. Egg hatching was inhibited when *M. chitwoodi* was exposed to the 1:5 diluted 1-butanol and ethyl acetate extracts.

Litchi tomato volatiles are toxic to potato cyst nematodes

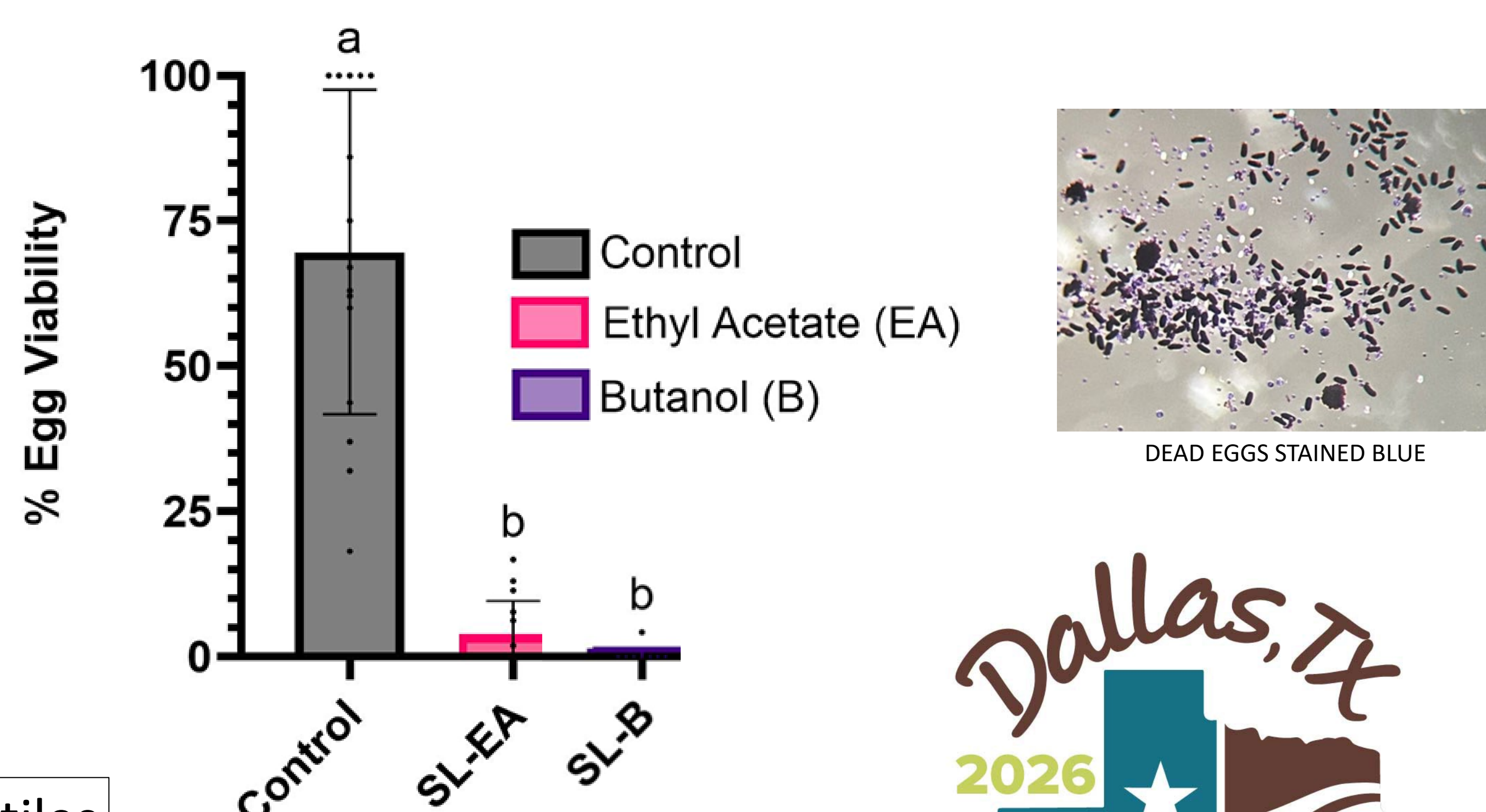


Volatiles from litchi tomato inhibited potato cyst nematode egg hatch compared to potato volatiles.

Conclusions

Litchi tomato extracts and volatiles suppress plant-parasitic nematodes, promising nematode control without incorporating litchi tomato into cropping systems.

Litchi tomato extracts are toxic to eggs



Litchi tomato extracts made from 1-butanol and ethyl acetate were effective in killing *M. chitwoodi* eggs.