Progress in biopesticides for hemp IPM

CERTIS USA
Leading Biopesticides

Brad Fritz, Certis USA Field Dev. Team
9145 Guilford Rd., Suite 175,
Columbia, MD 21046-1883

Corresponding Author Email: bfritz@certisusa.com

Pest Management in an Emerging Crop

Growing hemp in the United States continues to be challenging on many fronts, from finding reliable seed sources to marketing the end-use product. Additionally, protecting the hemp crop from disease and arthropod pests during the growing season presents further uncertainty, especially given the lack of federally registered pesticides for use on hemp. In spite of these hurdles, enterprising growers are finding ways to produce an economically viable crop, and Certis USA remains committed to bringing unique, effective, OMRI-listed products that fit within the developing hemp IPM framework.

As of October 2020, Certis USA has seven active ingredients registered for use on hemp with four additional active ingredients pending EPA approval (Tables 1 & 2). For outdoor grown hemp, corn earworm (*Helicoverpa zea*) is one of the key pest species due to direct feeding damage inflicted on developing flower buds used for CBD (cannabidiol) production. Without timely control measures, feeding damage caused by *H. zea* can also create entry points for plant pathogens like *Botrytis spp.*, the fungal organism responsible for botrytis bud rot. For indoor grown hemp, mites and powdery mildew are key pests that are rarely concerning in outdoor grown hemp. Here, we present 4 recent trials demonstrating the utility of Certis USA products for managing these emerging pests of hemp (Figures 1-4).

Certis Products Labeled for use on Hemp

Table 1. Certis USA insecticides with hemp currently added to the EPA stamped accepted label or pending approval. Each state may have their own state specific approved lists that may include more products than listed below. Check with your state department of agriculture for the most current list of approved products.

INSECTICIDES			
Product	**Active Ingredient**	**US EPA Hemp Approval?**	**Key Pests**
Agree® WG	*B.t. aizawai* strain GC-91	Pending EPA Approval	Lepidopteran larvae
BoteGHA™ ES	*Beauveria bassiana* strain GHA	Yes	Soft-bodied insects and mites
Crymax®	*B.t. kurstaki* strain EG7841	Yes	Lepidopteran larvae
Deliver®	*B.t. kurstaki* strain SA-12	Pending EPA Approval	Lepidopteran larvae
Gemstar®LC	*Helicoverpa zea* NPV	Yes	*Helicoverpa* larvae
Javelin® WG	*B.t. kurstaki* strain SA-11	Pending EPA Approval	Lepidopteran larvae
PFR-97™ 20% WDG	*Isaria fumosorosea* Apopka strain 97	Yes	Soft-bodied insects and mites
Sil-MATRIX® LC	Potassium silicate	Yes	Soft-bodied insects and mites

Table 2. Certis USA bactericides & fungicides with hemp currently added to the EPA stamped accepted label or pending approval. Check with your state department of agriculture for the most current list of approved products.

BACTERICIDES & FUNGICIDES			
Product	**Active Ingredient**	**US EPA Hemp Approval?**	**Key Pests**
Carb-O-Nator®	Potassium bicarbonate	Yes	Botrytis Powdery mildew
Double Nickel® 55 WDG or LC	*Bacillus amyloliquefaciens* strain D747	Pending EPA Approval	Botrytis Powdery mildew Rhizoctonia White mold
LifeGard® WG	*Bacillus mycoides* isolate J	Yes	Botrytis Powdery mildew White mold
Sil-MATRIX® LC	Potassium silicate	Yes	Powdery mildew

Hemp Field Trials from 2019-2020

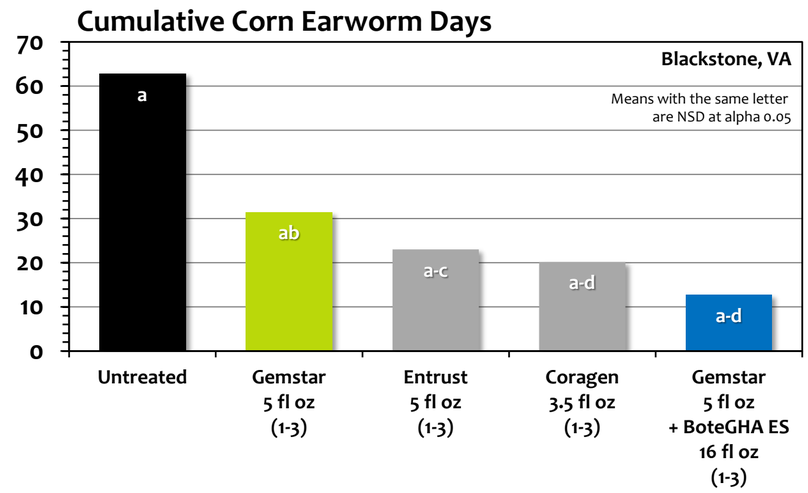

Figure 1. Efficacy of selected products for management of corn earworm (*H. zea*) on outdoor grown hemp.

- 3 spray apps. on 6-7 day intervals
- 3 assessments at 6-8 days after each spray; 10 buds/plot
- Cumulative corn earworm days calculated as a measure of overall control across 3 sampling dates.
- 20 total treatments, 5 treatments shown in the graph at right.
- Trial conducted by Kadie Britt & Dr. Tom Kuhar, Virginia Tech

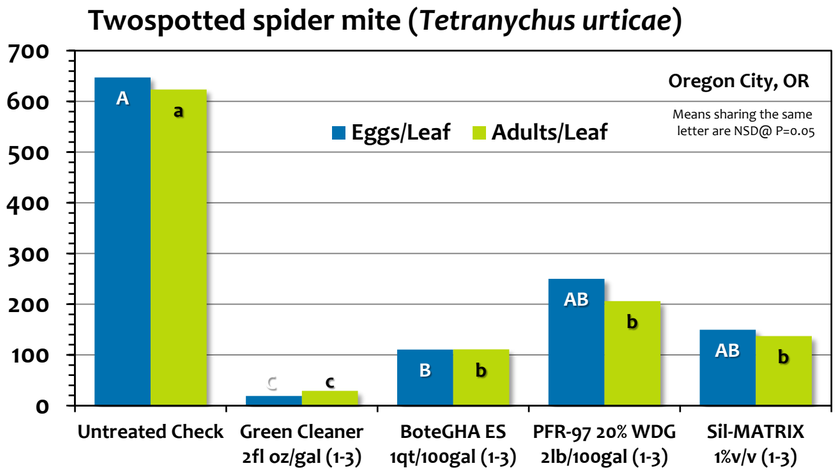

Figure 2. Efficacy of selected products for two-spotted spider mite control on indoor grown hemp.

- 3 spray apps. on 7 day intervals
- Assessment data shown from May 14th (7 DAT3)
- RCB design with 5 reps
- 3 leaves sampled / plant, with sampling data expressed as mites per leaf
- Trial conducted by Craig Collins, independent consultant at Collins Agricultural Consultants.

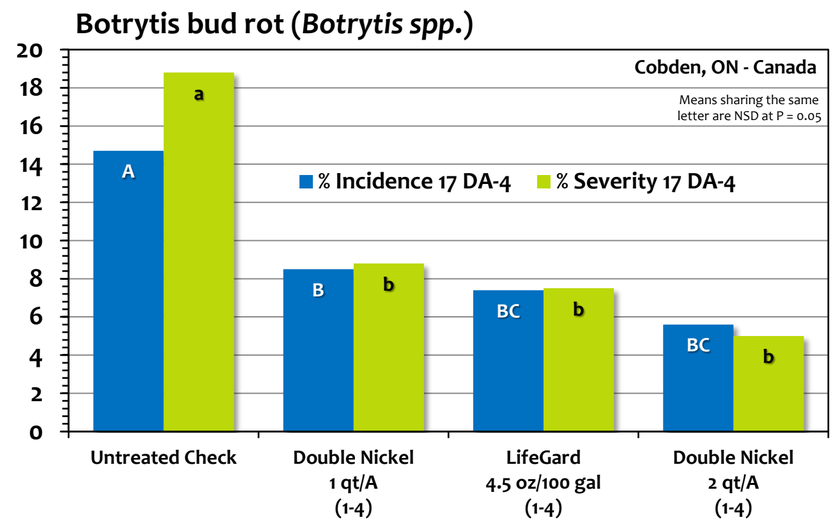

Figure 3. Efficacy of selected products for Botrytis bud rot control on outdoor grown hemp.

- 4 spray apps. on 10 day intervals, initiated at flowering
- Plants inoculated with *Botrytis* spores at flowering (3 DAT 1)
- RCB design with 4 reps
- 100 buds sampled / plot
- Trial conducted by Dr. James Coupland, independent consultant at Farm Forest Research Inc.

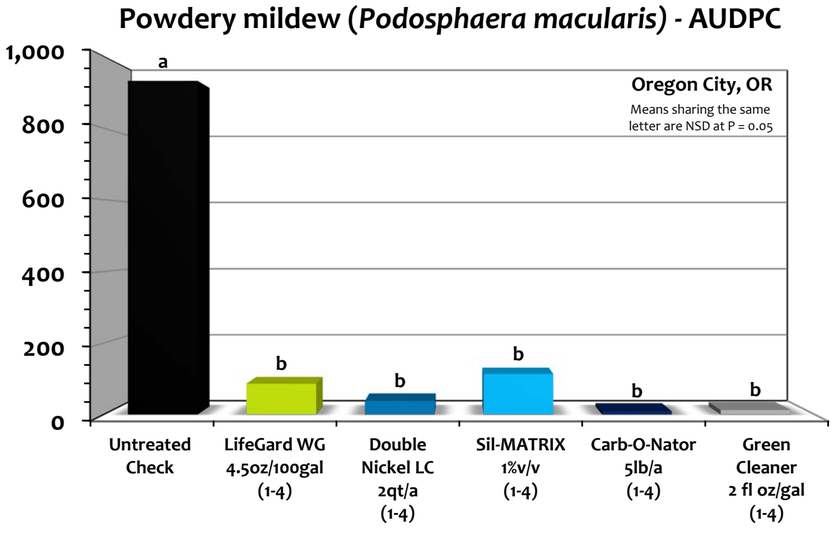

Figure 4. Efficacy of selected products for powdery mildew control on indoor grown hemp.

- 4 spray apps on 7 day intervals
- AUDPC = Area Under Disease Progress Curve; a quantitative summary of disease intensity / time
- RCB design with 5 reps
- Initial powdery mildew severity at 4-10% across treatments. Powdery mildew severity in UTC was 60% at final disease assessment.
- Trial conducted by Craig Collins, independent consultant at Collins Agricultural Consultants.