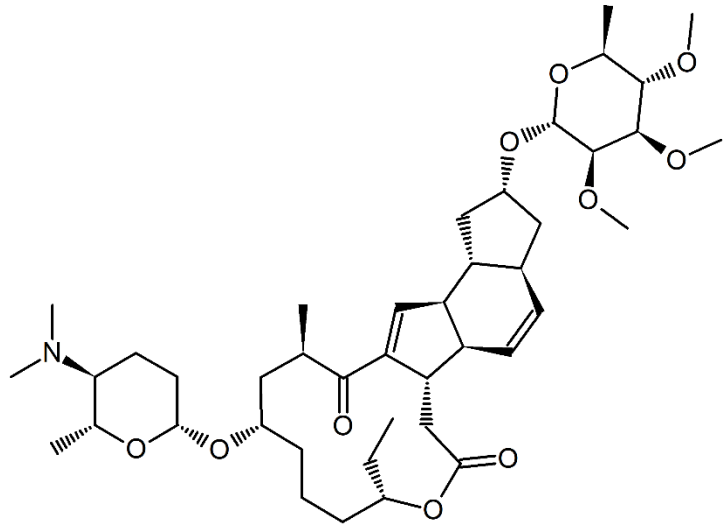
NEXT GENERATION

Natular® SC

An easier wide area larvicide

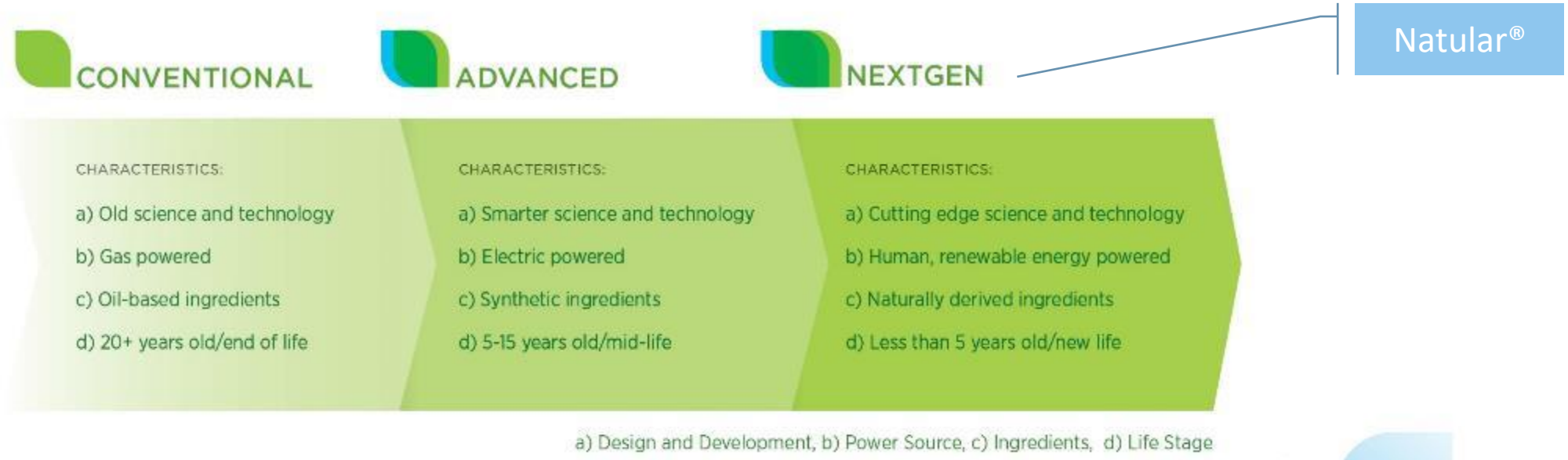
The Newest Addition to the Natular® Portfolio

About Spinosad



- A product of a **naturally occurring soil bacterium**
- **Unique mode of action**
- Unique class of chemistry – **IRAC Class 5**
- Controls **all four stages** of mosquito larvae
- Reviewed as the first **Reduced Risk** larvicide by the EPA
- Presidential **Green Chemistry** Challenge Award recipient
  - 1999: Dow AgroSciences (now Corteva), AI development
  - 2010: Clarke, Natular tablet technology

Our EcoTier Guidelines for Product Development



NEXTGEN

Natular SC Liquid Larvicide

The proven performance of **Spinosad,** plus exceptional **mixing**, **handling** and **application ease** for **wide-area** larvicide applications.

Wide Area Larviciding Today

Complex mixing and loading

Air blast applications

Treatment area surface spotting

Wide Area Larviciding Made Easy

Natular SC is Easy to Handle, Mix, Apply, Clean and Store

Flexible and Versatile

- Flexible use patterns
  - **Wide area** / air blast equipment
  - **Ground** treatments
  - **Aerial** applications
  - **Spot** / localized
- Wide range of labeled use sites, including urban, commercial, residential, rural and agricultural* areas

** See label for full site list*

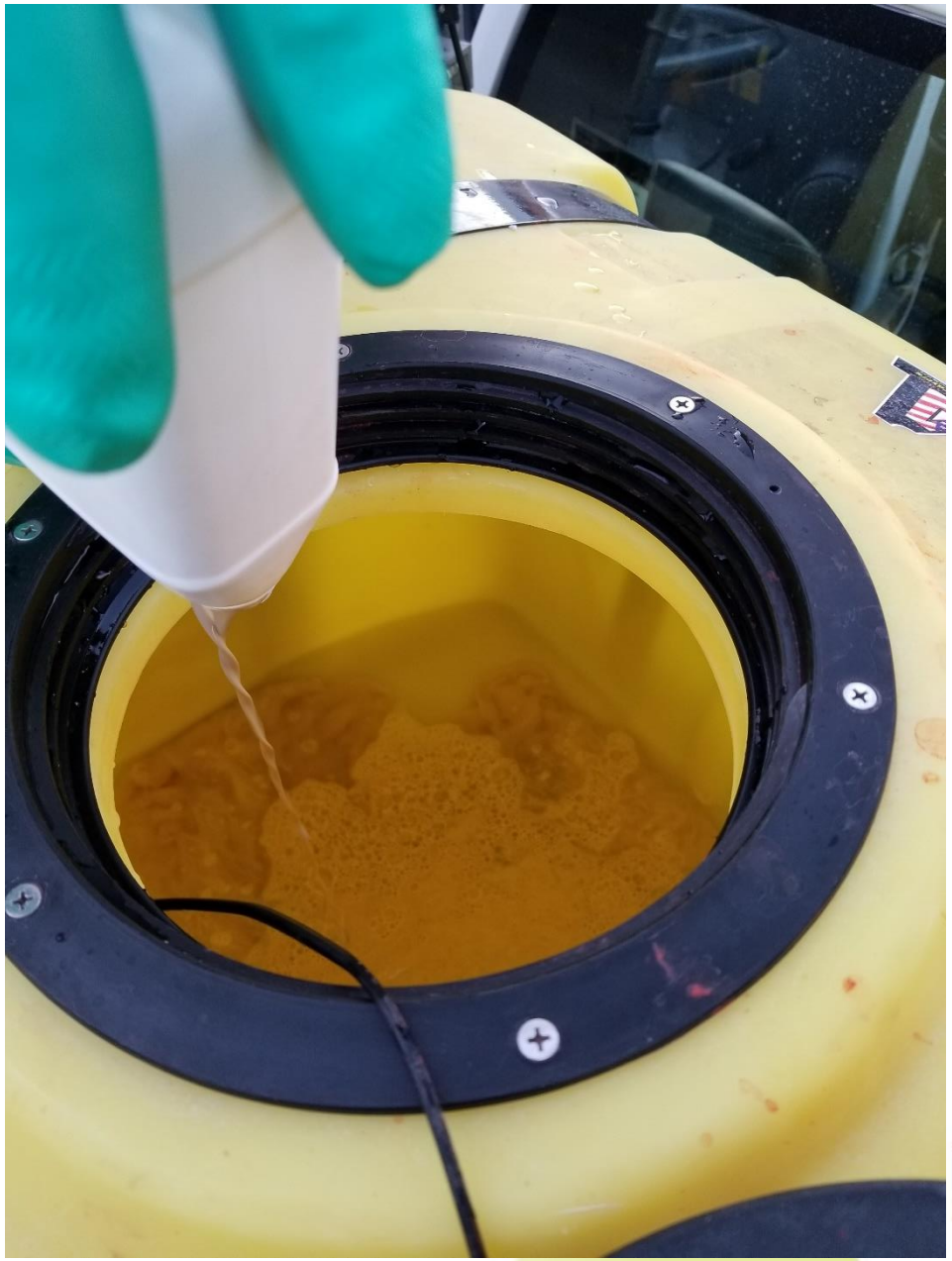
Optimized for Wide Area Applications

Buffalo Turbine or A1 Mister

TeeJet or Micronair nozzles

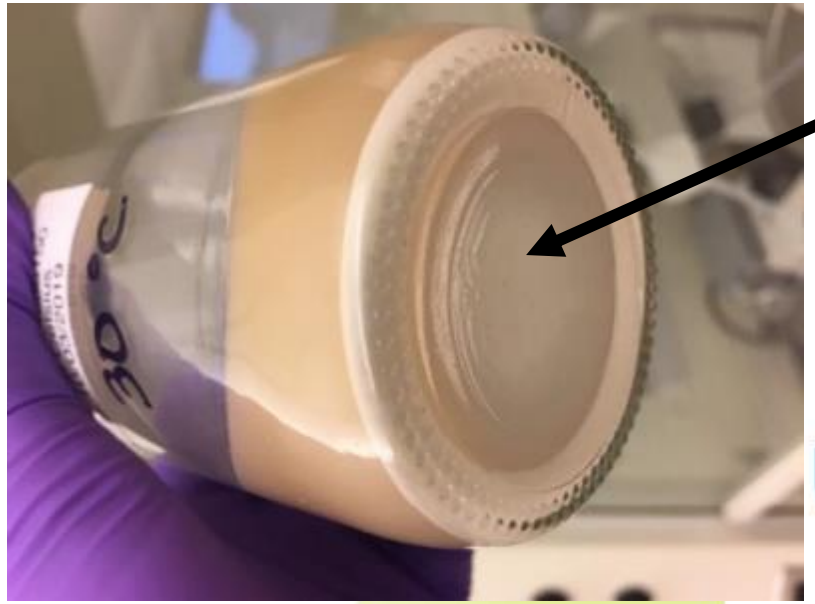
Fast and Easy Mixing

1. Shake Natular SC Container
2. Fill spray tank with 1/2 required water
3. Turn on recirculation pump
4. Add Natular SC
5. Add remaining water



Stability Lab Test

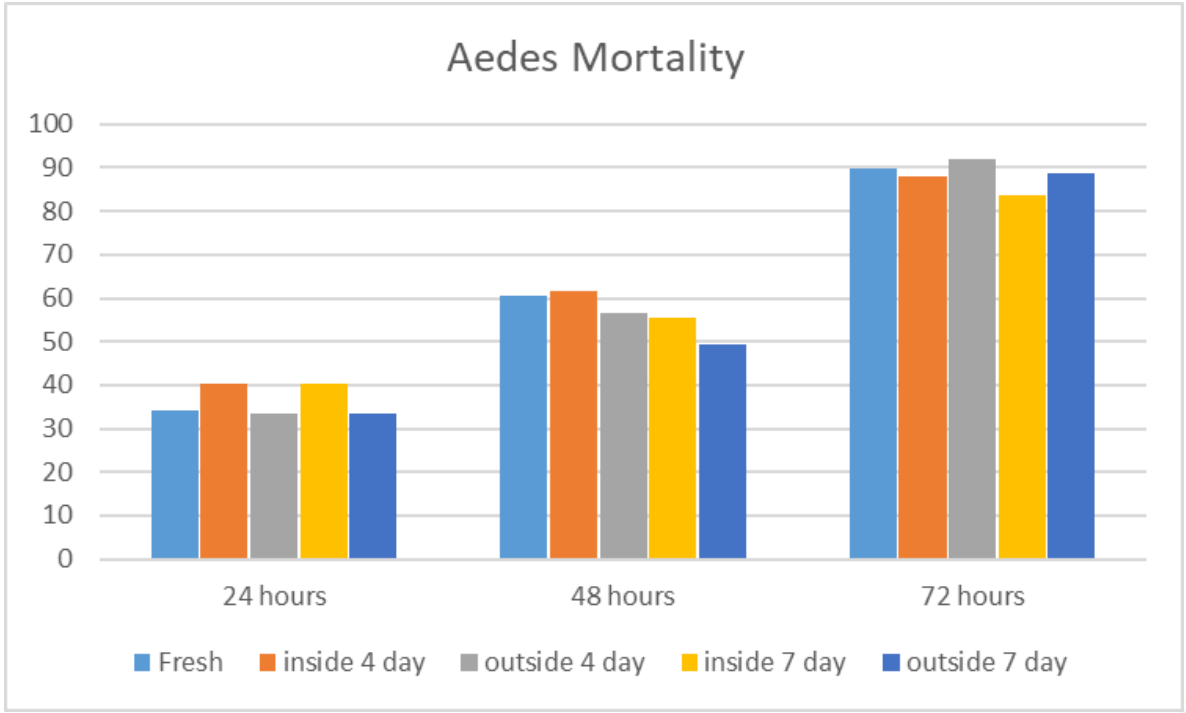
- **Highly stable suspension with no efficacy loss after 7 days!**
- Key findings:
  - SC will start to settle after one hour
  - SC will easily go back into suspension
  - SC will not lose efficacy: No difference in mortality observed *1 week after* initial mix



Flexibility Benefits of Stable Suspension

No loss of efficacy with mixed product after 1 week when mix is stored in **indoor or outdoor** conditions.

Study conducted on Clarke colony Aedes, Culex and Anopheles mosquitoes. Efficacy on all species was similar to Aedes results, shown here.



Stability in the Field

After sitting for 24 hours in the spray tank, only **recirculation pump** and **normal driving** needed to re-suspend formulation prior to application

Natular SC in spray tank
24hrs after initial mix

Rinses off Easily

Lab tests on paint coupons using diluted Natular SC at a rate **3x higher than normal application rates** demonstrate that surface spotting may occur in the treatment zone but **a simple water rinse, without scrubbing** removes the residue.

Natular SC at **15% dilution**, dried for 48 hours at 86 F.

Same SC paint coupon rinsed with plain water.

Vectobac WDG at **18% dilution**, dried for 48 hours at 86 F.

Same Vectobac WDG paint coupon rinsed with plain water.

Easy Clean-Up & Maintenance

- Common sense recommendations:
  - Flush application equipment regularly with water
  - Check filter regularly for any material build up
  - Wash chemical tank down with water periodically

Product Storage

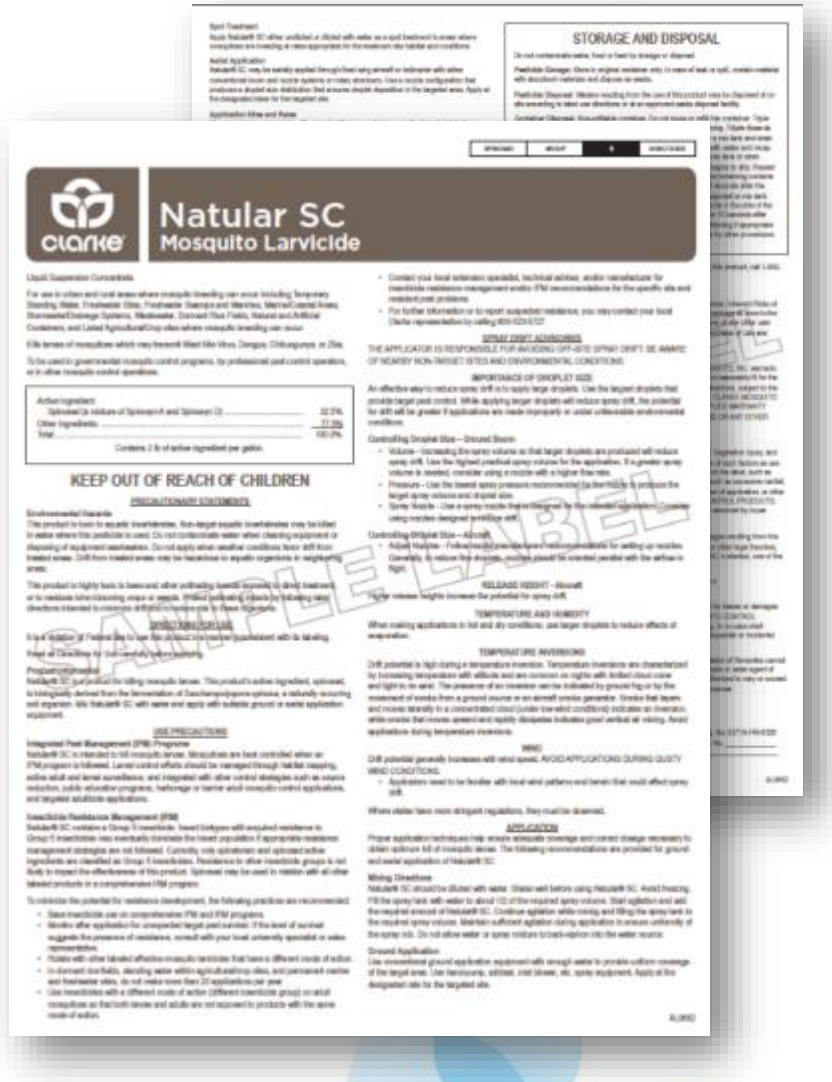
- Highly concentrated formula
- Compact packaging requires minimal shelf space
- Available in one gallon jugs, 4 gallons per case
- Stable suspension

Understanding the Product Label

Natular SC Sample Label

You'll find similar precautionary statements as those on all other Natular product labels regarding direct exposure

Toxicity to aquatic invertebrates and bees



Understanding Exposure, Hazard and Risk

Precautionary statements reflect inherent hazards:

- HAZARD = the inherent toxicity of an **active ingredient**, usually measured by an LD_{50}
  - 11 µg/bee is the standard threshold the EPA uses for determining the bee hazard of an active ingredient, *regardless of use pattern or use rate*

- EXPOSURE = contact with the **active ingredient**

- RISK = Hazard (or Toxicity) X Exposure

Risk can be managed by reducing exposure!

Managing Adverse Effect Risk

1. Manage exposure opportunities
    1. Start with understanding and following the label to limit exposure
    2. Follow pollinator stewardship best practices

2. Use RT25 study findings to inform operational protocols

In registering the product, the EPA has determined that when Spinosad is used at rates for public health mosquito control and according to the label, **risk to bees and aquatic invertebrates is mitigated.**

Following the label

Label language regarding product application is designed to mitigate adverse effects on the environmental and beneficial insects:

- Application rate
- Dose / droplet densities
- Application method
- Application timing
- Weather conditions

Responsible Stewardship Builds Trust

- Recommended Best Application Practices
  - Spray when pollinators are not active
    - Build an extra hour buffer around spray times to further reduce exposure risk
  - Use the lowest effective rate to minimize risks
    - Mosquito control application rates are exceptionally low
  - If possible, share plans for wide area larvicide applications through social media or website
    - Build on your public notification protocols for adult treatments
  - Expand your notification process to include advance treatment notifications to local hobbyists and bee keepers
    - Give them the option to cover their hives if they feel more comfortable doing so
  - Work with bee keepers and hobbyists to understand hive locations and proactively offer to turn off spray applications when in the area
    - Build goodwill and demonstrate responsible stewardship!

Understanding EPA's RT25 Results

- **The RT25:** a laboratory test designed to determine the length of time over which field weathered foliar residues remain toxic to exposed honey bees
- EPA-reviewed results on Spinosad at a rate of 0.16 lb ai/acre, which is **nearly 5x the recommended application rate for Natular SC,** show foliar residues are **non-toxic within 3 hours** of an application:

Consider your treatment window

Spinosad	NAF-315 (23.5)	0.16 lb a.i./A	alfalfa	<	3	Honey bee (*Apis mellifera*)
		0.16 lb a.i./A	alfalfa	<	3	Honey bee (*Apis mellifera*)

Source: https://www.epa.gov/pollinator-protection/residual-time-25-bee-mortality-rt25-data

Supplemental Clarke Research

- Clarke repeated the RT25 study with Natular SC using an application rate of 0.08 lb ai/acre (equivalent to 5.0 fl oz/acre), a **rate more than double the recommended public health use rate,** to give our Natular customers more confidence in their real world experience with this formulation

Natular SC	**0.08 lb ai/acre (5.0 fl oz/acre)**	alfalfa	<	**0**	Honey bee (*Apis mellifera*)

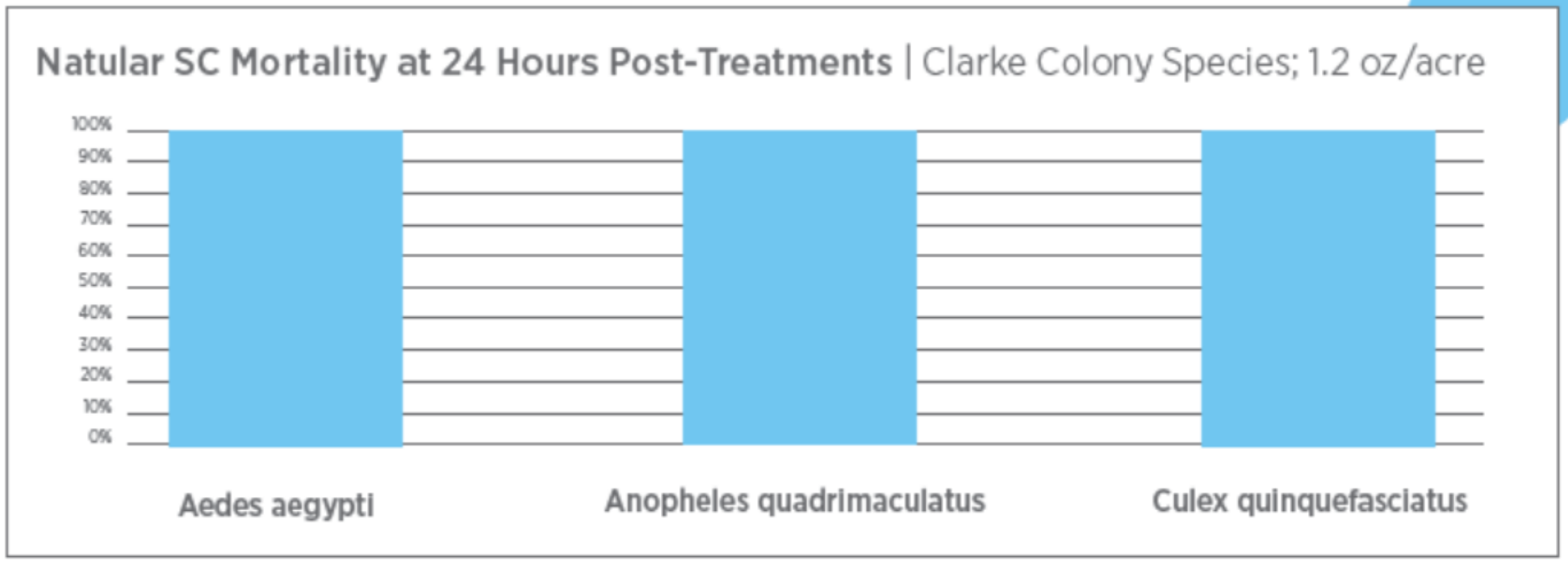
An RT25 of 0 (zero) means as soon as residues are dried (within about 10 minutes), Natular SC residues are not toxic to honey bees.

Consider your treatment window.

Product Efficacy

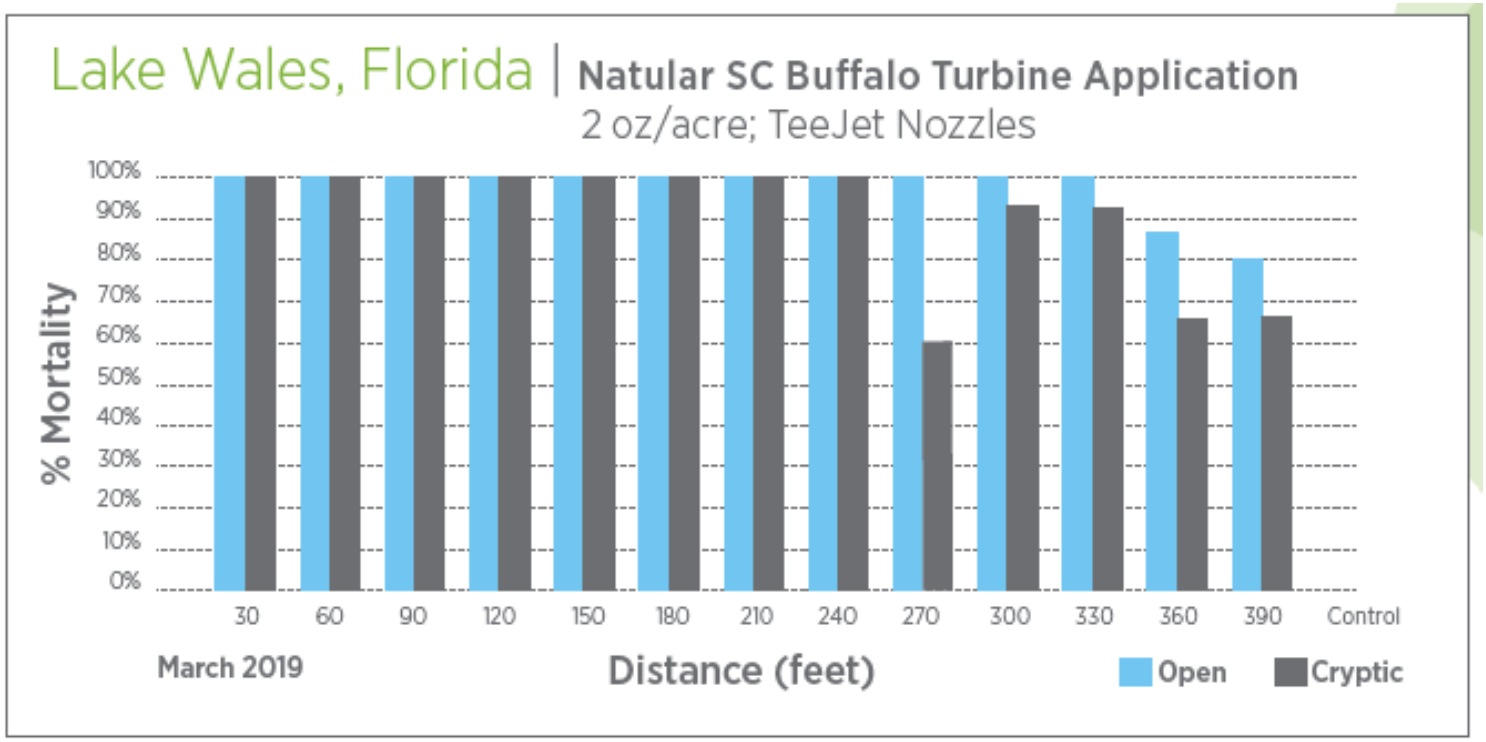
Lab Efficacy Testing

Lab efficacy testing on Clarke colony mosquitoes demonstrates Natular SC controls larvae from three major species.



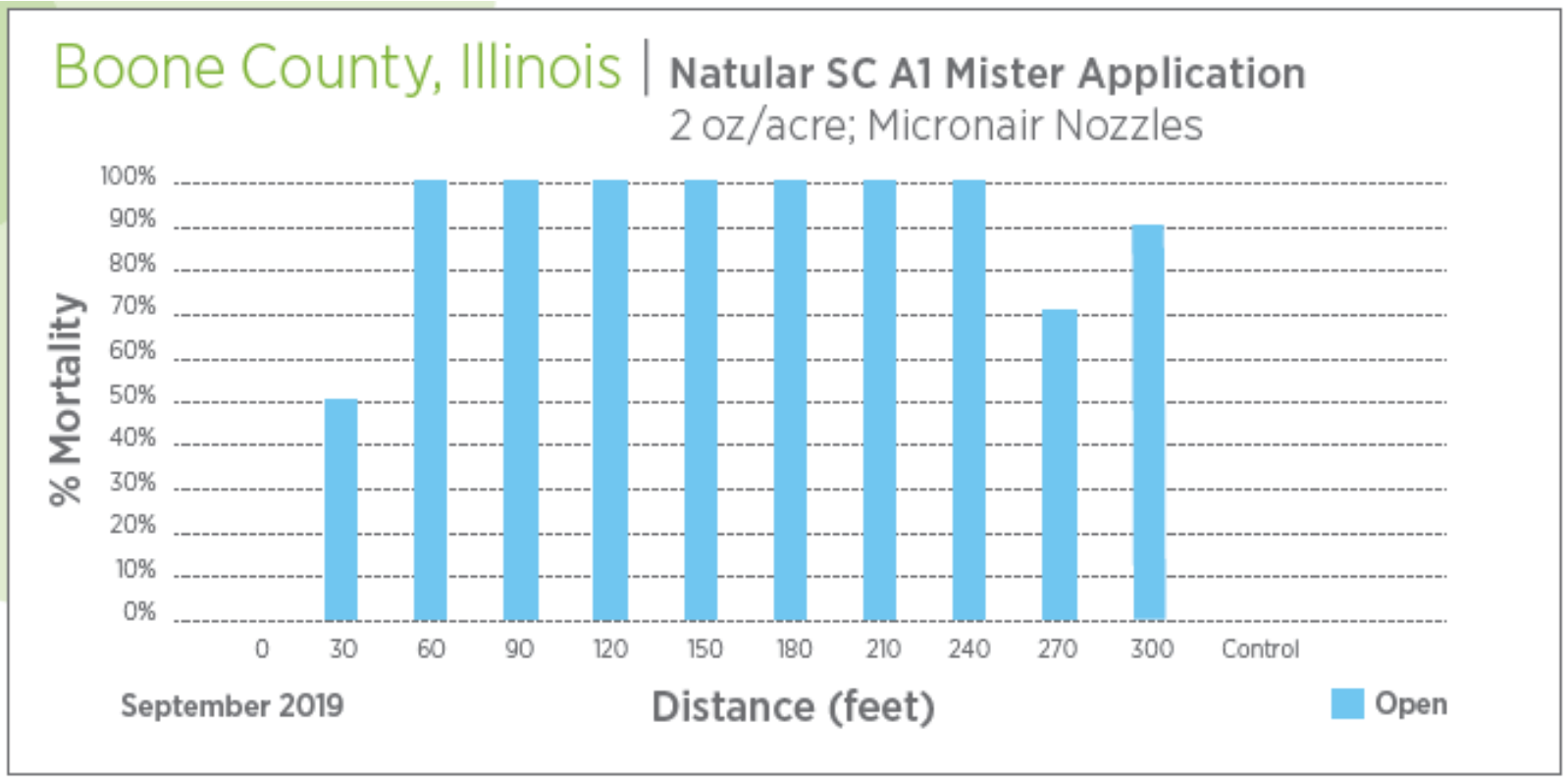
Wide Area Field Performance

Field trial work in Lake Wales, FL demonstrates the effectiveness of Natular SC on colony *Aedes aegypti* when applied through a Buffalo Turbine outfitted with TeeJet® nozzles in open field and simulated cryptic habitats.



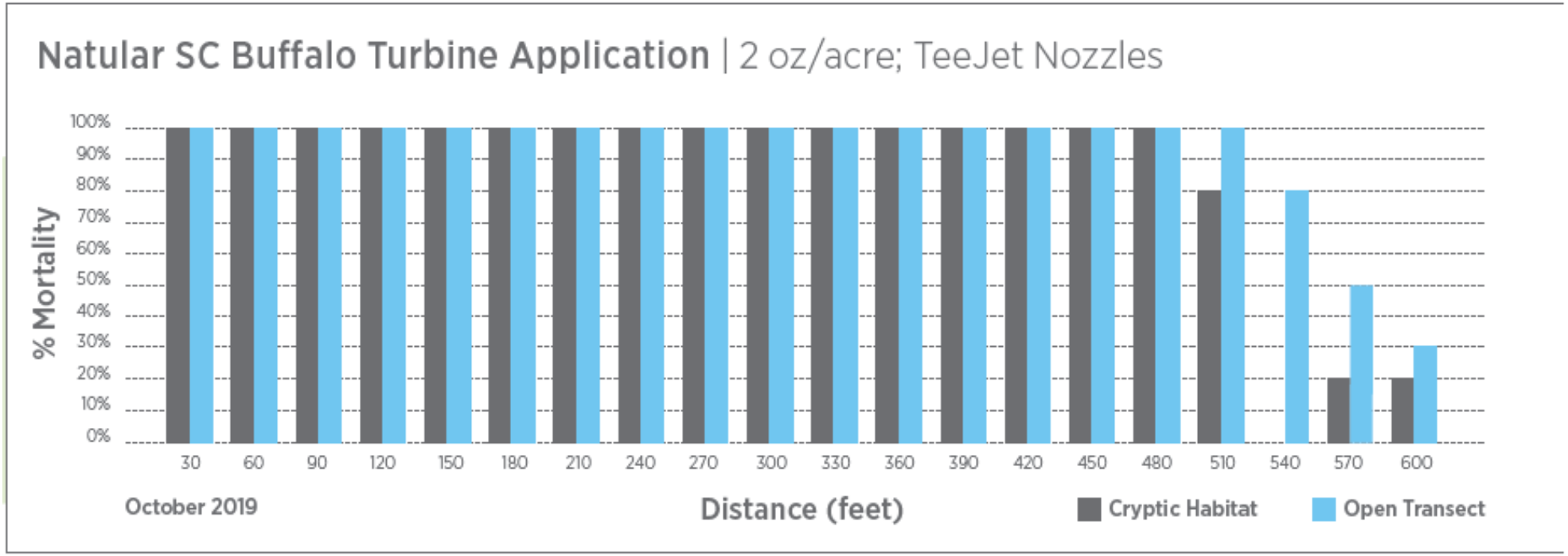
Wide Area Field Performance, cont.

Field trial work in Boone County, IL demonstrates the effectiveness of Natular SC on colony *Aedes aegypti* when applied through an A1 Mister with Micronair nozzles.



Operational Performance

The Cayman Islands Mosquito Control Unit used Natular SC for an extended operational trial in 2019. Applications were made through a Buffalo Turbine equipped with TeeJet® nozzles to control colony *Aedes aegypti* in residential and cryptic habitats on the island.



Application Recommendations

For wide area applications through air blast machines:

- 5% Natular SC diluted in water
- 2 fl oz Natular SC/acre (plus dilution) for container breeding mosquitoes
- 1.32 gal/min (5L/min) flow rate

Optimization by Equipment Type

	BT w/ TeeJet	BT w/ Micronair	A1 w/ Micronair
Motor Speed	Fixed; produces wind speeds of 120mph	Fixed; produces wind speeds of 120mph	Variable; full throttle required to produce wind speeds of 110 mph
Blade Pitch	NA	Variable 55 degrees recommended	Variable 55 degrees recommended
Air Volute Angle	90 degree recommended (perpendicular to the ground)	90 degree recommended (perpendicular to the ground)	90 degree recommended (perpendicular to the ground)
Flow Rate	5 L / Min recommended	5 L / Min recommended	5 L / Min recommended
Vehicle Speed	5-10 mph recommended	5-10 mph recommended	5-10 mph recommended
PSI	Around 100 PSI recommended	Around 50 PSI recommended	Around 50 PSI recommended
Droplet Size Range	150 – 500 µm	150 – 500 µm	150 – 500 µm

Program Fit Assessment

Are you seeking:	Natular SC	Vectobac WDG
Easy product mixing with just water	Yes	No
No mixing/loading equipment required	Yes	No
Quick mixing process	Yes	No
Low-foaming product	Yes	No
Stable suspension	Yes	No
Non-damaging formulation	Yes	No
Easy clean-up	Yes	No
Low odor	Yes	No
Compact packaging	Yes	No
Application equipment and nozzle flexibility	Yes	Yes
Wide area, ground spot, or aerial labeling	Yes	Yes

Thank you!