VALENT HEALTH™
Protecting Life's Potential

Katie F. Williams

10/21/2026



Mosquitoes, Habitats and Active Ingredients: Who, When, and Where

VALENT HEALTH™
Protecting Life's Potential

Introduction

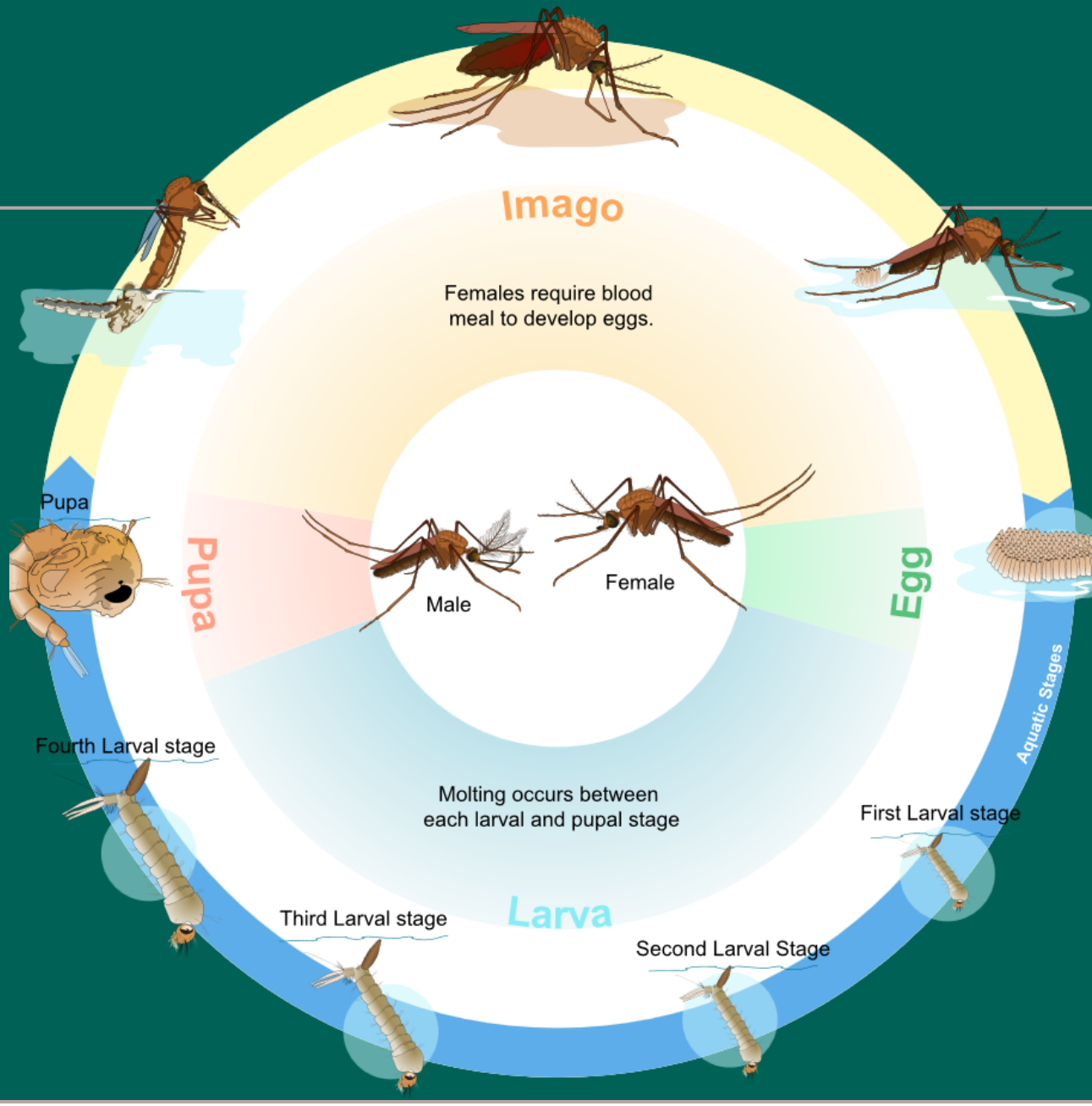
- Mosquito Biology
- Mosquito Habitats
    - Floodwater
    - Permanent Water
- Active Ingredients
- Where to use what products for which species



VALENT HEALTH™
Protecting Life's Potential

Mosquito Biology

- Complete Metamorphosis



VALENT HEALTH™
Protecting Life's Potential

Mosquito Eggs

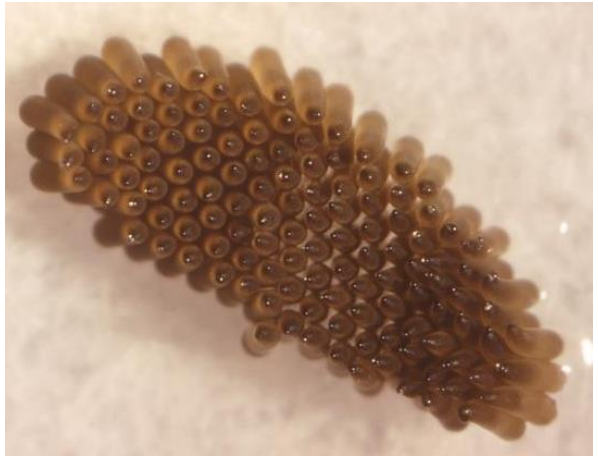


Aedes

Lay their eggs on the inner, wet walls of containers with water, above the waterline.

Mosquitoes generally lay 100 eggs at a time.

Eggs are very hardy; they stick to the walls of a container like glue and can survive drying out for up to 8 months— even over the winter.

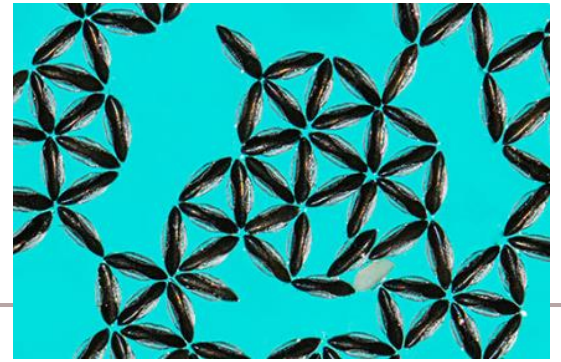


Culex

Lay eggs on the surface of fresh or stagnant water. Water sources can include barrels, horse troughs, ornamental ponds, unmaintained swimming pools, puddles, creeks, ditches, and marshy areas.

A female *Culex* mosquito lays eggs one at a time. Eggs stick together to form a raft of 100 to 300 eggs. The raft floats on the water

Anopheles



*L*ay their eggs in marshy areas or near banks of shallow creeks and streams.

Adult, female mosquitoes lay eggs one at a time directly on water. The eggs float on the surface of the water.

Adult, female mosquitoes lay 50–200 eggs at a time.

Eggs do not tolerate drying out.

VALENT HEALTH™
Protecting Life's Potential

Larvae

- Larvae have four larval instars
- All larval instars are feeding stages except late 4th instars
- Larval development takes anywhere from 3 days to several months, depending on water temperature
- Larvae are primarily filter feeders; eating organic matter, algae, bacteria and other microorganisms found in the water





VALENT HEALTH™
Protecting Life's Potential

Larval Respiration

- *Mansonia & Coquillettidia spp. Larvae*
  - Modified siphon for piercing plants
- *Anopheles* spp.
  Lack siphon; breathe through spiracles on the 8th abdominal segment







- *Culex* spp.
  - 4x longer than wide siphon with multiple tuffs
- *Aedes* spp.
  - Posteriorly located siphon, short and "football" shaped





VALENT HEALTH™
Protecting Life's Potential



Pupae

- Pupae are non-feeding
- Sit on the surface of the water to breathe through "trumpets" – tubes on the thorax
- The mosquito adult is forming inside the pupal casing
- Will emerge as an adult in 1-3 days

VALENT HEALTH™
Protecting Life's Potential

Adult Mosquitoes

- After adult mosquitoes emerge:

  Male mosquitoes feed on nectar from flowers

  Female mosquitoes feed on humans and animals for blood to produce eggs.

- After feeding, female mosquitoes will look for water sources to lay more eggs.



VALENT HEALTH™
Protecting Life's Potential

Mosquito Genera

Aedes
- aegypti
- albopictus
- infirmatus
- sollicitans
- taeniorhynchus
- vexans

Anopheles
- crucians
- quadrimaculatus
- walkeri

Coquillettidia
- perturbans

Culex
- erraticus
- nigripalpus
- quinquefasciatus
- restuans

Culiseta
- melanura

Toxorhynchites
- rutilus

Uranotaenia
- lowii
- sapphirina

Wyeomyia
- mitchellii
- smithii

Orthopodomyia
- signifera

Psorophora
- ciliata
- columbiae
- ferox








VALENT HEALTH™
Protecting Life's Potential

Larval Habitats

1

Running Water

Anopholes quadrimaculatus, Culex territans, Uranotaenia sapphirina

2

Transient/Floodwater

Woodland Pools- *Aedes stimulans*

3

Permanent Water

Freshwater Swamps-*Coquillettidia perturbans*





4

Container

Treehole-*Aedes triseriatus*

Artificial-*Aedes aegypti and albopictus*





VALENT HEALTH™
Protecting Life's Potential



Floodwater Mosquitoes

VALENT HEALTH™
Protecting Life's Potential



- Mosquitoes in Genera *Aedes, Ochlerotatus, and Psorophora*
- Most important pest species
- Bite humans, livestock and pets
- Large populations in spring and early summer

VALENT HEALTH™
Protecting Life's Potential

Permanent Water Mosquitoes



VALENT HEALTH™
Protecting Life's Potential

- Mosquitoes in genera *Culex, Anopholes and Coquillettidia*.
- Important vector species.
-Lay eggs directly on the water surface or on emergent plants
-Bodies of water that last for extended periods or year-round, can be stagnant or slow-moving water sources like marshes, swamps, freshwater and brackish ponds, and persistent ditches.



Active Ingredients-Larvicides

CLASS GROUP	AI COMPOUNDS	MODE OF ACTION	ACTIVITY SPECTRUM	TARGET SPECIFICITY
Bacterial Larvicide	Fermentation solid sand solubles of whole bacterium containing ICP's	Binds to midgut disrupting digestion and fluid balance		Very High
	Bacillus sphaericus	Bs: Mosquito-specific ICP	Mosquitoes	
	Bacillus thuringiensis subsp. *israelensis*	*Bti*: Nematocera-specific ICP	Mosquitoes, black flies, and closely related flies in Order Diptera: Suborder Nematocera	
Juvenile Hormone	Purified Compound	JH analog is specific to insects that undergo complete metamorphosis; inhibits emergence	Insects that undergo complete metamorphosis	
	(S)-Methoprene			High
	Pyriproxyfen			Moderate
Spinosyns	Metabolites of bacterial fermentation Spinosyn A and Spinosyn D	Neurotoxin specific to invertebrates binds to nicotinic acetylcholine receptors causing excitation of nerves, leading to involuntary muscle contractions	Insects and other invertebrates including some Crustacea and Mollusca	Moderate

VALENT HEALTH™
Protecting Life's Potential

Bacillus thuringiensis israelensis (Bti)-Who, When, Where

Who-

- *Aedes, Culex, Anopholes, Psorophora etc.*
- Black flies and midges

When-

- Active mosquito season early spring through late autumn or whenever temps are warm enough
- Regular intervals (single brood)-Reapply every 7 to 14 days or sooner if heavy rainfall washes it away
- Must be ingested so apply during 1-3 instar

Where-

- Around homes, birdbaths, rain barrels, gutters, flowerpot saucers
- Horse troughs, livestock water tanks, irrigation ditches, stormwater basins
- Pastures, snow melt pools, rice fields

FEATURES	BENEFITS
Biorational larvicide Biological larvicide mode of action	• Not harmful to non-target organism populations
Broad control of all mosquito species Available in various formulation types	• Application flexibility
Quickly kills mosquito larvae (2–24 hours)	• Results observed quickly in the field
Organic Material Review Institute (OMRI) and National Organic Program (NOP) certified (select formulations)	• Peace of mind when treating sensitive mosquito larval habitats
Virtually dust-free dry formulations	• Less respirable and particulate dust







VALENT HEALTH™
Protecting Life's Potential

Bacillus sphaericus (Bs)-Who, When, Where

Who-

- *Culex, Aedes, Anopholes, Coquillettidia, and Psorophora*

When-

- Active mosquito season early spring through late autumn or whenever temps are warm enough
- Lasts approximately 1-4 weeks depending on the site and weather conditions
- Must be ingested so apply during 1-3 instar

Where-

- Wastewater
- Septic ponds
- Agricultural settings
- Catch basins
- Storm drains
- Septic ditches







(S)- Methoprene: Who, When, Where

Who-

- *Aedes, Ochlerotatus, Psorophora, Anopholes, Culex, Culiseta, Coquillettidia, and Mansonia*

When-

- Active mosquito season early spring through late autumn or whenever temps are warm enough
- Can be applied up to 28 days before a site floods
- Insect growth regulator so you look for emergence inhibition, works by absorption
- Apply 2-4 instar

Where-

- Natural wetlands, freshwater swamps, tidal marshes, cattail marshes, bogs, and flood plains
- Woodland pools, grassy swales, and pastures
- Catch basins





VALENT HEALTH™
Protecting Life's Potential

Spinosad: Who, When, Where

Who-

- *Aedes, Anopholes, Culex*

When-

- Late spring and early summer
- Apply when active larval surveillance shows young mosquito larvae 2-4 instar
- Anywhere from 2 to 4 weeks, up to 180 days of control depending on formulation

Where-

- Yard drains, rain barrels, catch basins, birdbaths, water collecting debris
- Car tires
- Stormwater retention ponds, woodland pools, snowmelt pools, and drainage ditches





VALENT HEALTH™
Protecting Life's Potential

Thank You

Please let me know if you have any questions

Katie.Williams@valent.com