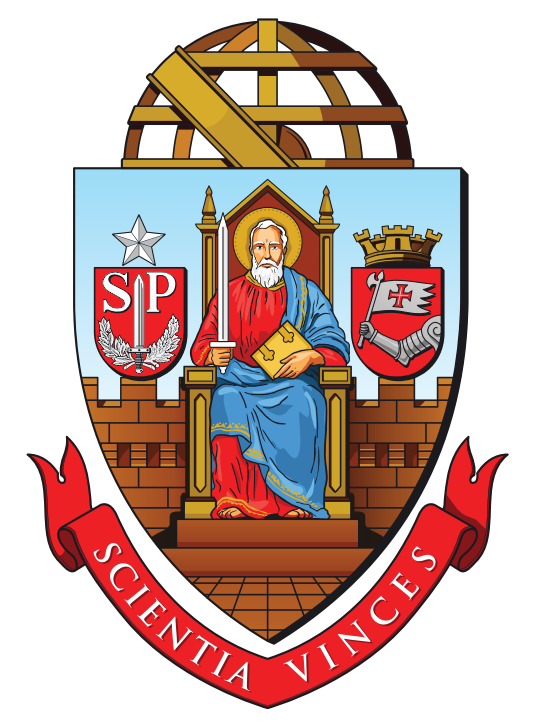


Refining Degree-Day Models for Sparganothis Fruitworm in Cranberry by Biofix and Variety



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Sparganothis Fruitworm Management

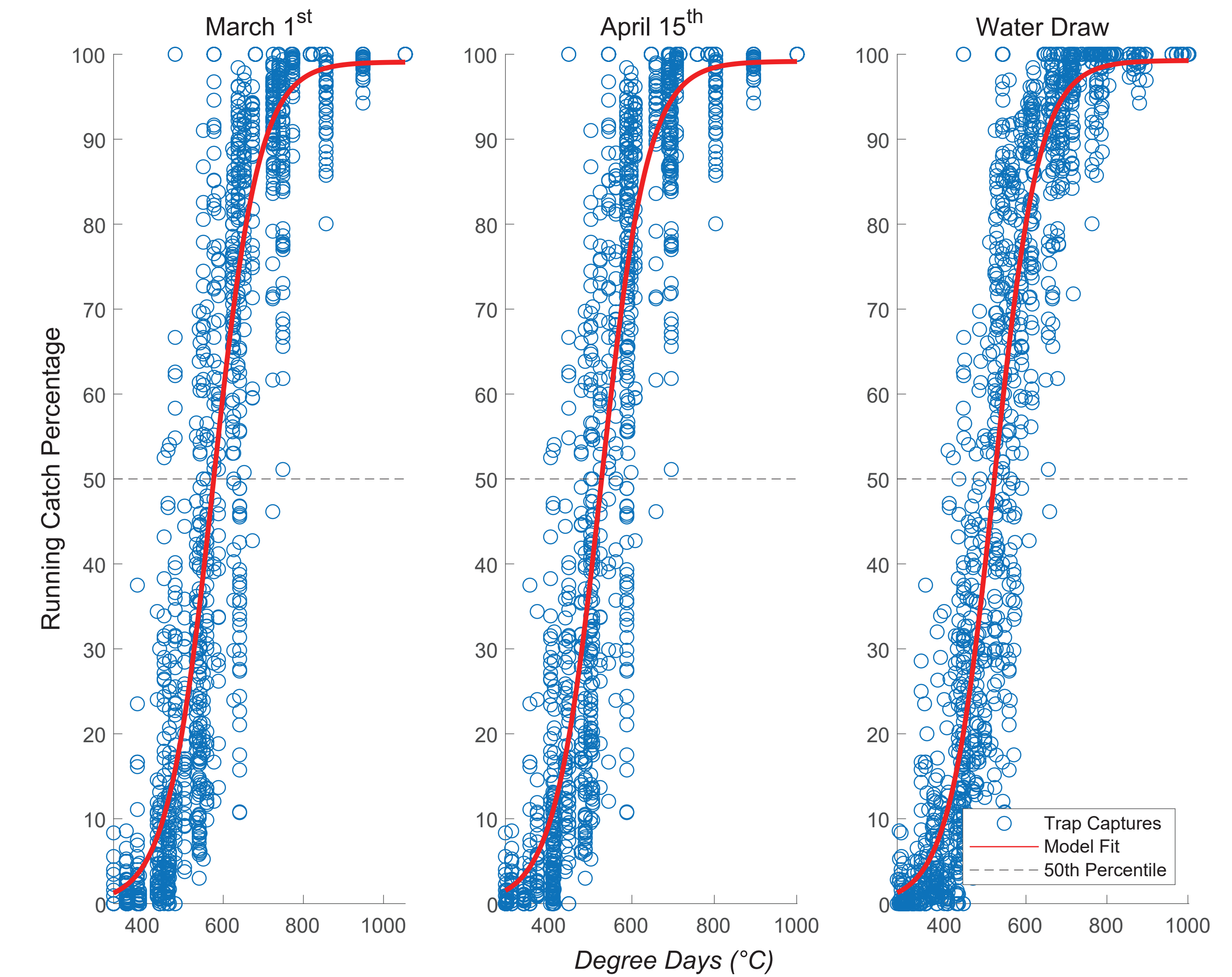
- Sparganothis fruitworm (*S. sulfureana*) is a native pest of cranberry in New Jersey
- *S. sulfureana* overwinter as larvae, are active in spring, and first-generation adults emerge in summer
- Spring development begins with cranberry growth after winter floodwater is removed
- Eggs are laid by the end of bloom, second-generation larvae cause the most damage, feeding on developing fruit
- Growers time insecticide applications two weeks after peak flight of moths in bog

Goal: Improve the peak flight degree-day model for *S. sulfureana* based on biofix date and cranberry variety for improved use in New Jersey



Photo credits: Elvira de Lange, Department of Entomology, Rutgers University

Predictive Models



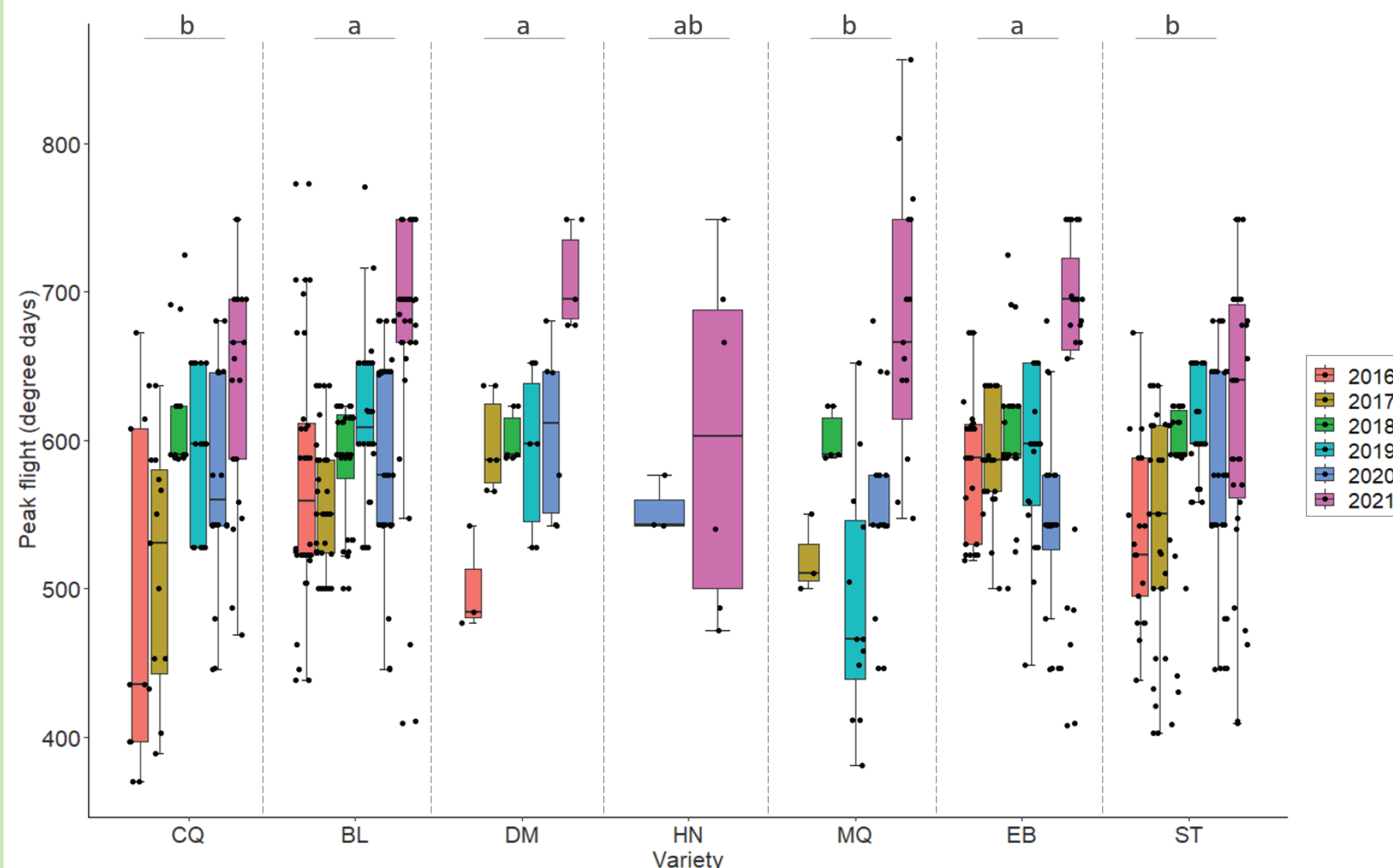
Degree-day model fits of *S. sulfureana* percent seasonal capture with a biofix determined by: March 1st, April 15th, and water draw. 50th percentile dashed line represents peak flight.

Parameters for *S. sulfureana* degree-day models by biofix

Biofix	Parameters			
	<i>a</i>	<i>x</i> ₀	<i>b</i>	<i>r</i> ²
March 1 st	99.1 ± 0.8	575.1 ± 2.1	57.2 ± 1.8	0.87
April 15 th	99.2 ± 0.8	525.5 ± 2.0	56.1 ± 1.7	0.88
Water Draw	99.3 ± 0.7	521.0 ± 1.8	55.2 ± 1.65	0.89

$$f(x) = \frac{a}{1 + e^{\frac{-(x-x_0)}{b}}}$$

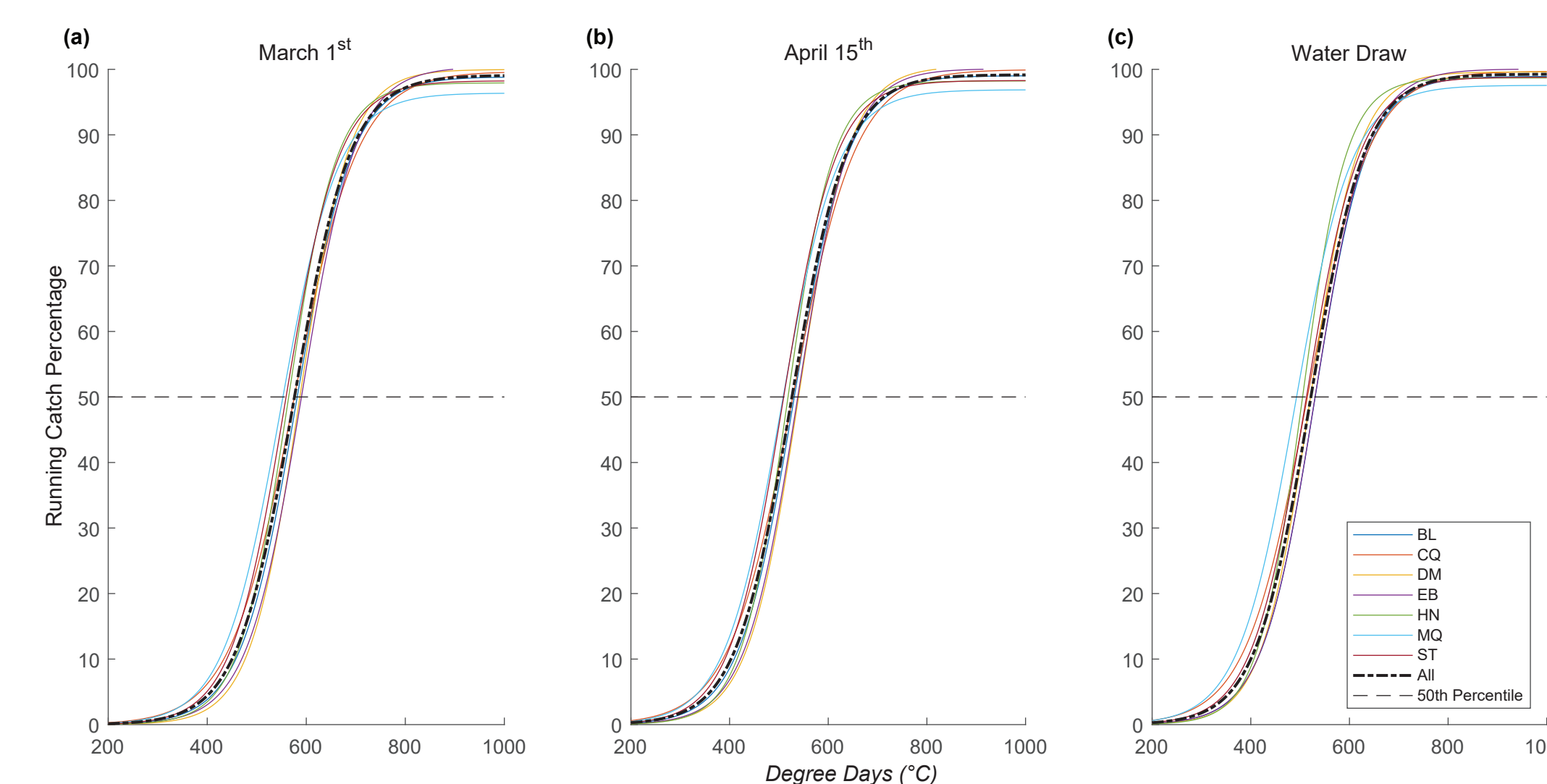
Peak Flight by Variety and Year



Box plots of *Sparganothis sulfureana* peak flight in degree days using an April 15th biofix by cranberry variety across years.

CQ = Crimson Queen, BL = Ben Lear, DM = Demoranville, HN = Haines, MQ = Mullica Queen, EB = Early Black, ST = Stevens

Different letters indicate differences among varieties (Fisher's LSD test; *P* = 0.05)



Degree-day model fits of *S. sulfureana* percent seasonal capture by cranberry variety with a biofix determined by: March 1st, April 15th, and water draw. 50th percentile dashed line represents peak flight.

Parameters for *S. sulfureana* degree-day models by variety using and April 15th biofix

Variety	Parameters			
	<i>a</i>	<i>x</i> ₀	<i>b</i>	<i>r</i> ²
BL	99.0 ± 1.5	530.1 ± 3.7	55.3 ± 3.1	0.87
CQ	100.0 ± 2.5	528.0 ± 6.7	64.4 ± 5.5	0.86
DM	100.5 ± 3.3	540.4 ± 7.8	51.7 ± 6.4	0.91
EB	100.1 ± 1.7	538.3 ± 3.9	52.9 ± 3.2	0.89
HN	98.2 ± 4.6	516.8 ± 14.0	46.7 ± 11.2	0.93
MQ	96.9 ± 3.0	504.9 ± 8.5	57.4 ± 7.1	0.86
ST	98.3 ± 4.5	507.8 ± 3.7	53.8 ± 3.2	0.89

Climate Change

Projected changes in spring temperatures and peak flight between by 2050 compared to historical (1991–2020) spring temperatures using the April 15th (annual day 105) biofix

Scenario	March–May Average Temperature Change	Change in Average Annual Peak Flight Day
SSP2-4.5	+2.8 °C (1.9–3.4)	-6.6
SSP3-3.0	+3.0 °C (2.6–3.9)	-7.4