

IPPC Model Synthesis Summary - Sept. 17, 2014 vers. 1.2

Developed by Len Coop for use at Oregon State University's Integrated Plant Protection Center website: <http://uspest.org/wea>

Emerald Ash Borer Phenology (degree-day) Model *Agrilus planipennis* Fairmaire

Model based on S. A. D. Duarte, M.S. Thesis, The Ohio State Univ. 2013

Primary model reference: https://etd.ohiolink.edu/!etd.send_file?accession=osu1366365415&disposition=inline

This is an invasive insect attacking and emerging from logs and timbers of ash (*Fraxinus* spp.)

Emerald Ash Borer Model Parameters:

Lower threshold: 50F (10C) (several Refs. Available including primary ref above)

Upper threshold: 100F (37.8C) (nominal - none determined)

Start Date: Jan. 1st

Calculation Method: single sine

Region of known use: Great Lakes (Michigan and Ohio)

Validation status: based on 2 years data from one region, more data required from other years and regions before robustness and accuracy can be documented.

Events and degree-days used in emerald ash borer model:

Event	DDs (F)	DDs (C)
First adult emergence in spring	550	306
10% adult emergence	653	363
50% adult emergence	855	475
95% adult emergence	1491	828
Last adult emergence	2500	1389

Note: First adult emergence changed from 599 to 550 DDF to match earlier models and because of high error rates and low sample size for this event in primary model reference

Summarized from Tables 3.2 and 3.7-3.13 (using 50F Tlow, DDF)

	Latitude (N)	1 st emerg		10% emerge		50% emerg		peak emerg (95%)		end of emerge	
		<u>2011</u>	<u>2012</u>	<u>2011</u>	<u>2012</u>	<u>2011</u>	<u>2012</u>	<u>2011</u>	<u>2012</u>	<u>2011</u>	<u>2012</u>
Cincinnati OH	39o8'	601	477	666	693	973.8	905.4	1568	1885	2714	2855
Columbus OH	40o1'		657				747		1447		2255
Delaware OH	40o21'	630		644.4	696.6	829.8	1011.6	1490	2408	2273	3334
Wooster OH	40o47'	614	634	724.5	633.6	823.5	756	1085	1069	2156	2752
Toledo OH	41o39'	524	517	525.6	580.5	887.4	867.6	1640	1328	2718	2693
Midland MI	43o37'	670	661		721.26	721.26	892.8	924	1703	1663	2286
mean		607.8	589.2	640.1	665.0	847.2	863.4	1341.4	1640.0	2304.8	2695.8
st dev		53.5	86.0	83.5	57.2	92.7	99.7	317.2	472.1	439.7	399.5
C.V		8.8	14.6	13.0	8.6	10.9	11.5	23.6	28.8	19.1	14.8
Mean 2011-2012		598.5		652.6		855.3		1490.7		2500.3	

Other models (all with 50F lower threshold):

Prior IPPC model: start date Mar. 1; events (DDF): 400 first adult emergence approx beginning, 500: first adult emerg approx.

End, 1000 peak adult activity

Traditional first emergence model: start date Jan. 1; 305 DDC, 549 DDF

Current APHIS PPQ model: start date Jan. 1; 450-499 emergence, 900-1099 peak activity, 1100-1499 declining activity