SUPPLEMENTARY DATA

Table S1. Statistical indicators for validating the generated equations (MLR models) to predict the first seasonal adult/egg/larvae occurrence of both flights/generations of *L. botrana*.

Developmental stage	*n* datasets	Statistical indicators				
		R^2	SD observed	SD predicted	RMSE	BIAS*
1st flight adults	8	0.856	3.370	2.690	1.650	0.951
1st generation eggs	7	0.632	4.567	4.082	2.806	-0.050
1st generation larvae	5	0.923	5.418	3.824	2.178	0.760
2nd flight adults	22	0.700	6.304	4.692	3.571	-0.696
2nd generation eggs	12	0.681	4.212	3.309	2.416	0.384
2nd generation larvae	9	0.782	3.823	3.041	2.024	-0.891

* Negative BIAS = forecast is biased xx days too early; positive BIAS = forecast is biased xx days too late.

Table S2. Number of generated equations and site clusters providing data for *L. botrana*/ *E. ambiguella* MLR models per flight/generation and developmental stage.

L. botrana – final equation			
Developmental stage	Σ generated equations	Site clusters used to generate final equation	
		for calibration	for validation
1st flight adults	19	3, 4, 5, 7, 10, 12, 14	9, 5, 12
1st generation eggs	16	3, 5, 7, 14	9
1st generation larvae	19	4, 5, 7, 9, 10, 14	5, 9, 10
2nd flight adults	75	3, 5, 9, 12, 13, 14	1, 3, 4, 5, 13
2nd generation eggs	25	3, 5, 7, 9, 12, 14	3, 5, 9
2nd generation larvae	20	3, 5, 7, 9, 12, 13, 14	3, 5
E. ambiguella – final equation			
Developmental stage	Σ generated equations	Site clusters used to generate final equation	
		for calibration	for validation
1st[t] flight adults	23	5, 6, 12, 14	1, 4, 5, 8, 12
1st generation eggs	22	5, 12	5
1st generation larvae	12	5, 12	5
2nd flight adults	47	5, 7, 9, 12, 13, 14	1, 5, 7, 12
2nd generation eggs	13	5, 7, 9, 12, 13, 14	12
2nd generation larvae	11	5, 7, 9, 12, 13, 14	12

Table S3. Statistical indicators for validating the generated equations (MLR models) to predict the first seasonal adult/egg/larvae occurrence of both flights/generations of *E. ambiguella*.

Developmental stage	*n* datasets	Statistical indicators				
		R^2	SD observed	SD predicted	RMSE	BIAS*
1st flight adults	12	0.744	3.424	4.158	2.767	-1.788
1st generation eggs **	-	-	-	-	-	-
1st generation larvae **	-	-	-	-	-	-
2nd flight adults	15	0.729	4.676	4.015	2.442	0.196
2nd generation eggs	10	0.689	3.378	6.359	4.146	-0.998
2nd generation larvae	11	0.541	3.214	2.426	3.586	-2.848

* Negative BIAS = forecast is biased xx days too early; positive BIAS = forecast is biased xx days too late.

**No validation possible due too insufficient amount of datasets (n = 1).

Table S4. Prediction accuracies of the validated MLR models.

Developmental stage	*L. botrana*			*E. ambiguella*		
	Prediction accuracies in %			Prediction accuracies in %		
	Too early	Correct*	Too late	Too early	Correct*	Too late
1st flight adults	0	88	12	42	58	0
1st generation eggs **	14	86	0	-	-	-
1st generation larvae **	0	100	0	-	-	-
2nd flight adults	27	64	9	6	67	27
2nd generation eggs	0	100	0	10	70	20
2nd generation larvae	11	89	0	18	82	0

*The prediction was considered as correct, if the determined optimal deviation range of ± 2 days for the adults and ± 4 days for egg and larvae stage was not exceeded (see section Material & Methods: Multiple linear regression analysis).

**No validation possible for *E. ambiguella* 1st generation egg and larvae stage, due too insufficient amount of dataset.

Table S5. Statistical indicators for validating the existing MLR models to predict the first seasonal occurrence of 1st flight adults of *L. botrana* and *E. ambiguella*.

Existing MLR model for predicting 1st flight adults of	*n* datasets	Statistical indicators				
		R^2	SD observed	SD predicted	RMSE	BIAS*
L. botrana	8	0.019	3.370	3.248	4.707	3.891
E. ambiguella	12	0.538	3.424	3.294	3.602	-2.635

*Negative BIAS = forecast is biased xx days too early; positive BIAS = forecast is biased xx days too late.