

Table S1. Dates of first, last and peak occurrences of the five nymphal instars and adults spittlebugs (peak dates = max no. of nymphs sampled)

		<i>Philaenus spumarius</i>			<i>Neophilaenus campestris</i>			<i>Aphrophora alni</i>		
		first	peak	last	first	peak	last	first	peak	last
2016	1st	23-Mar	23-Mar	23-Mar	—	—	—	—	—	—
	2nd	23-Mar	23-Mar	20-Apr	23-Mar	31-Mar	27-Apr	—	—	—
	3rd	23-Mar	12-Apr	05-May	23-Mar	12-Apr	05-May	—	—	—
	4th	31-Mar	12-Apr	05-May	12-Apr	27-Apr	05-May	27-Apr	27-Apr	05-May
	5th	12-Apr	05-May	05-May	12-Apr	27-Apr	05-May	27-Apr	05-May	05-May
	Ad	27-Apr	27-Sept	16-Dec	27-Apr	24-May	16-Dec	24-May	01-Sept	17-Oct
2017	1st	17-Mar	17-Mar	12-Apr	17-Mar	17-Mar	12-Apr	27-Mar	27-Mar	27-Mar
	2nd	17-Mar	27-Mar	02-May	17-Mar	12-Apr	12-Apr	27-Mar	12-Apr	02-May
	3rd	27-Mar	12-Apr	02-May	12-Apr	12-Apr	12-Apr	12-Apr	02-May	02-May
	4th	12-Apr	02-May	10-May	12-Apr	12-Apr	10-May	02-May	02-May	02-May
	5th	12-Apr	10-May	10-May	02-May	02-May	02-May	10-May	10-May	22-May
	Ad	02-May	30-May	22-Nov	10-May	19-Oct	22-Nov	22-May	30-May	19-Oct

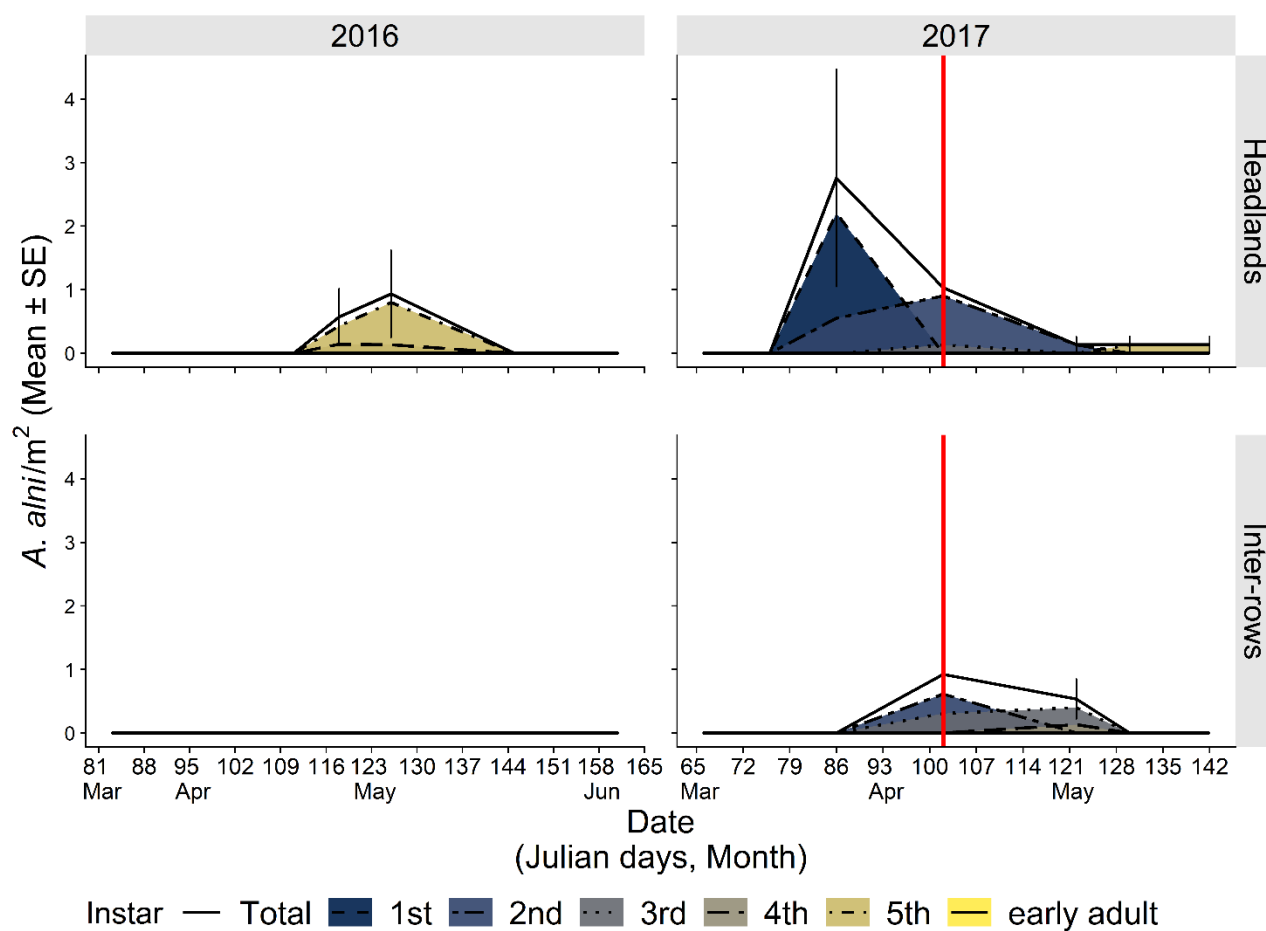


Figure S2. Life stage structure of the preimaginal populations of *Aphrophora alni* in vineyard inter-rows and headlands. The area curves of each nymphal instar, the total nymphs, and the newly emerged adults are based on the mean densities, as estimated by quadrat sampling on each sampling date. Red vertical lines represent the date of mowing treatment.

Table S3. Absolute (number) and relative (percentage) distributions of *Philaenus spumarius* nymphs according to plant genera on which they were found in an organic vineyard in Asti (North Western Italy) during 2016-2017 surveys. Plant genera are arranged in descending order of *Philaenus spumarius* nymphs observed on them.

Host plant taxon		No. nymphs sampled			% on total nymphs
Genus	Family	2016	2017	Total	
<i>Plantago</i>	Plantaginaceae	541	429	970	15.209
<i>Cerastium</i>	Caryophyllaceae	333	354	687	10.771
<i>Trifolium</i>	Fabaceae	474	137	611	9.580
<i>Taraxacum</i>	Asteraceae	220	199	419	6.569
<i>Rumex</i>	Polygonaceae	270	21	291	4.563
<i>Medicago</i>	Fabaceae	274	14	288	4.516
<i>Erigeron</i>	Asteraceae	175	86	261	4.092
<i>Veronica</i>	Plantaginaceae	130	130	260	4.077
<i>Convolvulus</i>	Convolvulaceae	245	9	254	3.982
<i>Hypochaeris</i>	Asteraceae	121	122	243	3.810
<i>Picris</i>	Asteraceae	219	15	234	3.669
<i>Geranium</i>	Geraniaceae	132	66	198	3.104
<i>Poa</i>	Poaceae	174	—	174	2.728
<i>Crepis</i>	Asteraceae	74	68	142	2.226
<i>Sonchus</i>	Asteraceae	121	—	121	1.897
<i>Lotus</i>	Fabaceae	39	64	103	1.615
<i>Bellis</i>	Asteraceae	43	42	85	1.333
<i>Bromus</i>	Poaceae	73	—	73	1.145
<i>Avena</i>	Poaceae	68	1	69	1.082
<i>Salvia</i>	Lamiaceae	51	11	62	0.972
<i>Solidago</i>	Asteraceae	52	7	59	0.925
<i>Poaceae</i> spp.	Poaceae	13	42	55	0.862
<i>Asteraceae</i> spp.	Asteraceae	12	33	45	0.706
<i>Artemisia</i>	Asteraceae	—	42	42	0.659
<i>Stellaria</i>	Caryophyllaceae	1	40	41	0.643
<i>Galium</i>	Rubiaceae	27	10	37	0.580
<i>Vicia</i>	Fabaceae	35	—	35	0.549
<i>Potentilla</i>	Rosaceae	18	17	35	0.549
<i>Erodium</i>	Geraniaceae	29	3	32	0.502
<i>Rapistrum</i>	Brassicaceae	—	31	31	0.486
<i>Ranunculus</i>	Ranunculaceae	31	—	31	0.486
<i>Daucus</i>	Apiaceae	27	1	28	0.439
<i>Centaurea</i>	Asteraceae	26	—	26	0.408
<i>Fabaceae</i> spp.	Fabaceae	26	—	26	0.408
<i>Calepina</i>	Brassicaceae	25	—	25	0.392
<i>Myosotis</i>	Boraginaceae	9	15	24	0.376

<i>Caryophyllaceae</i> spp.	Caryophyllaceae	—	24	24	0.376
<i>Sanguisorba</i>	Rosaceae	5	17	22	0.345
<i>Cirsium</i>	Asteraceae	17	—	17	0.267
<i>Papaveraceae</i>	Papaveraceae	—	14	14	0.220
<i>Euphorbia</i>	Euphorbiaceae	—	13	13	0.204
<i>Cichorium</i>	Asteraceae	—	12	12	0.188
<i>Leucanthemum</i>	Asteraceae	10	1	11	0.172
<i>Brassicaceae</i>	Brassicaceae		10	10	0.157
<i>Sorghum</i>	Poaceae	10	—	10	0.157
<i>Hieracium</i>	Asteraceae	6	1	7	0.110
<i>Lactuca</i>	Asteraceae	7	—	7	0.110
<i>Mentha</i>	Lamiaceae	6	—	6	0.094
<i>Ranunculus</i>	Ranunculaceae		6	6	0.094
<i>Achillea</i>	Asteraceae	2	3	5	0.078
<i>Ornithogalum</i>	Asparagaceae	4		4	0.063
<i>Thesium</i>	Thesiaceae	—	4	4	0.063
<i>Muscari</i>	Asparagaceae	3	—	3	0.047
<i>Ambrosia</i>	Asteraceae	3	—	3	0.047
<i>Senecio</i>	Asteraceae	—	3	3	0.047
<i>Capsella</i>	Brassicaceae	—	3	3	0.047
<i>Liliaceae</i>	Liliaceae	—	3	3	0.047
<i>Leontodon</i>	Asteraceae	1	1	2	0.031
<i>Echium</i>	Boraginaceae	2	—	2	0.031
<i>Coronilla</i>	Fabaceae	1	1	2	0.031
<i>Hordeum</i>	Poaceae	2	—	2	0.031
<i>Lolium</i>	Poaceae	2	—	2	0.031
<i>Calendula</i>	Asteraceae	1	—	1	0.016
<i>Dianthus</i>	Caryophyllaceae	1	—	1	0.016
<i>Convolvulus</i>	Convolvulaceae	1	—	1	0.016
<i>Euphorbiaceae</i> spp.	Euphorbiaceae	1	—	1	0.016
<i>Lathyrus</i>	Fabaceae	1	—	1	0.016
<i>Carex</i>	Poaceae	1	—	1	0.016
<i>Alchemilla</i>	Rosaceae	1	—	1	0.016
<i>Fragaria</i>	Rosaceae	1	—	1	0.016
<i>Populus</i>	Salicaceae	1	—	1	0.016
<i>Solanum</i>	Solanaceae	—	1	1	0.016
Not on plant		20	1	20	0.329
Unknown plant taxa		11	14	34	0.547

Table S4. Output of the generalized linear mixed models (GLMM) for the effects height of herbaceous cover (*height_herb_cover*), percentage of herbaceous cover (*%_herb_cover*), and vineyard zone on density of *Philaenus spumarius* nymphs (#/m²) during peak period of 2016 survey (2016-03-20 – 2016-05-10).

Effects	Beta	95% CI ¹	p-value
Fixed			
Intercept	5.7	5.5, 6.0	<0.001
height_herb_cover	0.16	0.04, 0.28	0.011
%_herb_cover	0.06	-0.03, 0.16	0.18
Zone			0.057
<i>Inter-rows</i>	—	—	
<i>Headlands</i>	0.18	-0.01, 0.37	
Random			
Date SD_(Intercept)	0.19		

¹CI = Confidence Interval

Table S5. Output of the linear mixed models (LMM) for the effects height of herbaceous cover (*height_herb_cover*), percentage of herbaceous cover (*%_herb_cover*), and vineyard zone on density of *Neophilaenus campestris* nymphs (#/m²) during peak period of 2016 survey (2016-03-20 – 2016-05-10).

Effects	Beta	95% CI ¹	p-value
Fixed			
Intercept	5.0	4.6, 5.4	<0.001
height_herb_cover	-0.16	-0.40, 0.08	0.18
%_herb_cover	0.05	-0.21, 0.31	0.69
Zone			<0.001
<i>Inter-rows</i>	—	—	
<i>Headlands</i>	-0.67	-1.0, -0.31	
height_herb_cover * %_herb_cover	0.10	-0.09, 0.28	0.30
height_herb_cover * Zone			<0.001
<i>height_herb_cover * Headlands</i>	-0.71	-1.1, -0.32	
%_herb_cover * Zone			0.018
<i>%_herb_cover * Headlands</i>	0.44	0.08, 0.80	
Random			
Date SD (Intercept)	0.35		
Residual SD Observation	1.1		

¹CI = Confidence Interval

Table S6. Output of the binomial generalized linear mixed models (GLMM) for the effects Season, Vegetation component, and Year on sex ratio of *P. spumarius* adults.

Effects	log(OR) ¹	95% CI ¹	p-value
(Intercept)	-0.39	-0.80, 0.02	0.065
Season			<0.001
<i>Apr-Jun</i>	—	—	
<i>Jul-Sept</i>	-0.42	-1.0, 0.12	
<i>Oct-Dec</i>	-0.60	-2.1, 0.86	
Vegetation_component			0.61
<i>Grapevine</i>	—	—	
<i>Herbaceous</i>	0.09	-0.37, 0.54	
<i>Shrubs-Trees</i>	0.16	-0.28, 0.60	
Year			0.010
<i>2016</i>	—	—	
<i>2017</i>	0.09	-0.46, 0.65	
Season * Vegetation_component			0.80
<i>Jul-Sept * Herbaceous</i>	0.04	-0.52, 0.60	
<i>Oct-Dec * Herbaceous</i>	-0.30	-1.7, 1.1	
<i>Jul-Sept * Shrubs-Trees</i>	0.21	-0.35, 0.76	
<i>Oct-Dec * Shrubs-Trees</i>	0.47	-1.8, 2.8	
Season * Year			0.19
<i>Jul-Sept * 2017</i>	0.38	-0.04, 0.80	
<i>Oct-Dec * 2017</i>	0.13	-0.51, 0.77	
Vegetation_component * Year			0.077
<i>Herbaceous * 2017</i>	0.10	-0.46, 0.65	
<i>Shrubs-Trees * 2017</i>	-0.32	-0.89, 0.25	
Date SD (Intercept)	0.14		

¹OR = Odds Ratio, CI = Confidence Interval

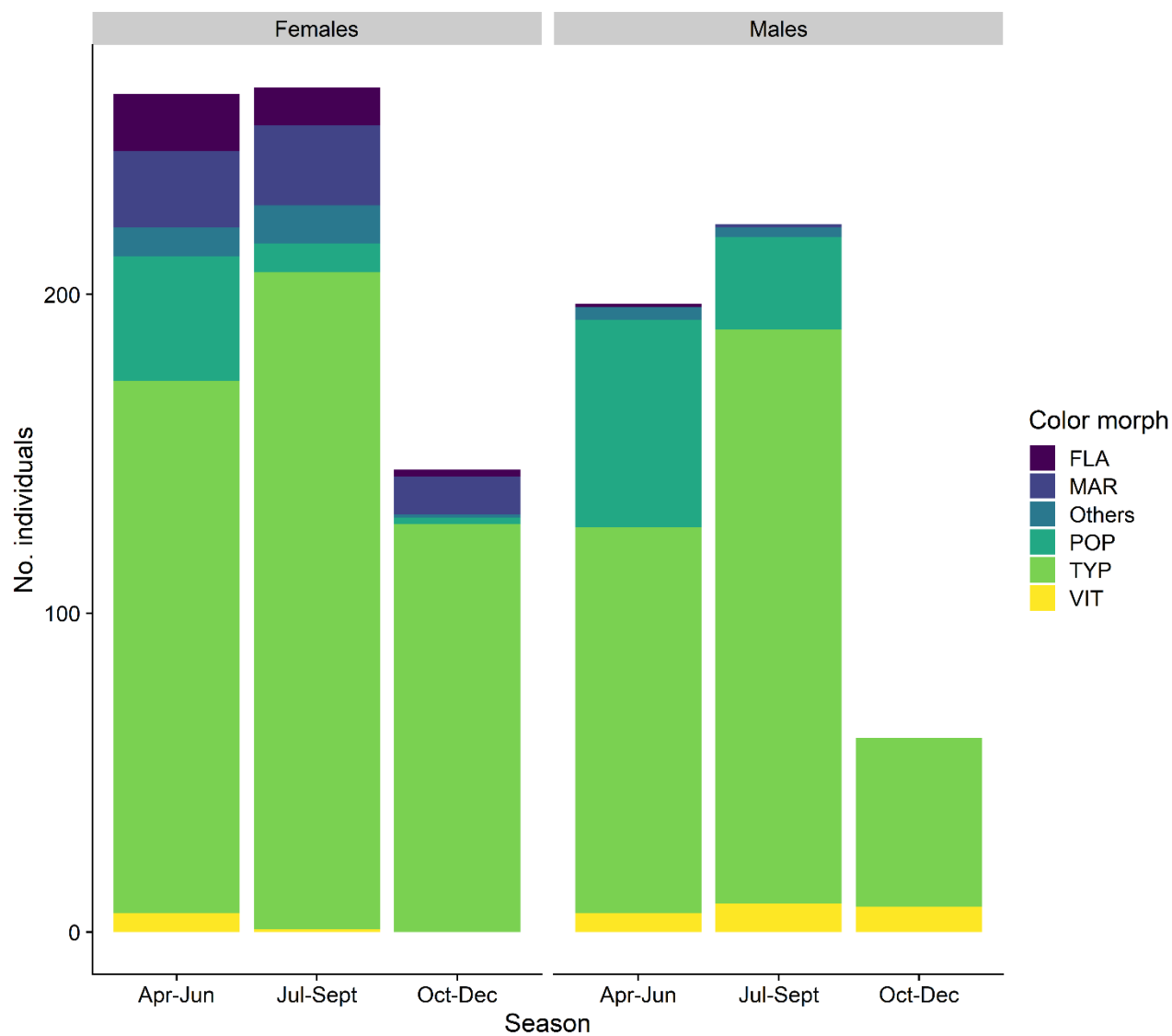


Figure S7. Prevalence of principal color morphs of *Philaenus spumarius* adults in the Asti vineyard during 2016-2017 surveys. Data aggregated per sex and sampling season.

Table S8. Output of the negative binomial generalized linear models (GLM) for the effects Season, Sex, and Vegetation component on colour morphs frequency among *P. spumarius* adults during 2017 survey.

Effects	Beta	95% CI ¹	p-value
(Intercept)	0.14	-1.8, 2.8	0.90
Colour_morph * Season			0.88
<i>MAR * Jul-Sept</i>	0.76	-2.5, 4.2	
<i>Others * Jul-Sept</i>	1.0	-2.0, 4.1	
<i>POP * Jul-Sept</i>	-0.15	-2.9, 2.8	
<i>TYP * Jul-Sept</i>	1.1	-1.7, 4.0	
<i>VIT * Jul-Sept</i>	0.34	-2.8, 3.7	
<i>MAR * Oct-Dec</i>	1.4	-2.6, 5.7	
<i>Others * Oct-Dec</i>	0.35	-3.9, 4.7	
<i>POP * Oct-Dec</i>	-1.1	-4.8, 3.0	
<i>TYP * Oct-Dec</i>	1.6	-1.8, 5.6	
<i>VIT * Oct-Dec</i>	1.5	-2.3, 5.7	
Colour_morph * Sex			<0.001
<i>MAR * Male</i>	-0.50	-4.9, 4.0	
<i>Others * Male</i>	3.2	-0.01, 7.3	
<i>POP * Male</i>	4.3	1.3, 8.4	
<i>TYP * Male</i>	3.5	0.62, 7.5	
<i>VIT * Male</i>	5.7	2.4, 9.9	
Colour_morph * Vegetation_component			>0.99
<i>MAR * Herbaceous</i>	1.0	-3.2, 5.2	
<i>Others * Herbaceous</i>	-0.54	-4.6, 3.3	
<i>POP * Herbaceous</i>	-0.65	-4.5, 2.7	
<i>TYP * Herbaceous</i>	0.30	-3.4, 3.5	
<i>VIT * Herbaceous</i>	1.2	-3.0, 5.4	
<i>MAR * Shrubs-Trees</i>	0.71	-3.0, 4.5	
<i>Others * Shrubs-Trees</i>	0.28	-3.3, 3.9	
<i>POP * Shrubs-Trees</i>	-0.43	-3.7, 2.8	
<i>TYP * Shrubs-Trees</i>	-0.05	-3.2, 3.0	
<i>VIT * Shrubs-Trees</i>	0.67	-3.1, 4.9	

¹CI = Confidence Interval