

Supplementary information for the article:

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Supplementary Information

Spatial clusters of *Varroa destructor* control strategies in Europe. *Journal of Pest Science*, 2022.

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Table S1. Utilized packages of the statistical software R version 4.0.4.

Name	Reference
tidyverse	Wickham et al., (2019). Welcome to the tidyverse. <i>Journal of Open Source Software</i> , 4(43), 1686, https://doi.org/10.21105/joss.01686
here	Kirill Müller (2020). here: A Simpler Way to Find Your Files. R package version 1.0.1. https://CRAN.R-project.org/package=here
readxl	Hadley Wickham and Jennifer Bryan (2019). readxl: Read Excel Files. R package version 1.3.1. https://CRAN.R-project.org/package=readxl
gridExtra	Baptiste Auguie (2017). gridExtra: Miscellaneous Functions for "Grid" Graphics. R package version 2.3. https://CRAN.R-project.org/package=gridExtra
factoextra	Alboukadel Kassambara and Fabian Mundt (2020). factoextra: Extract and Visualize the Results of Multivariate Data Analyses. R package version 1.0.7. https://CRAN.R-project.org/package=factoextra
Factoshiny	Pauline Vaissie, Astrid Monge and Francois Husson (2021). Factoshiny: Perform Factorial Analysis from 'FactoMineR' with a Shiny Application. R package version 2.4. https://CRAN.R-project.org/package=Factoshiny
reshape2	Hadley Wickham (2007). Reshaping Data with the reshape Package. <i>Journal of Statistical Software</i> , 21(12), 1-20. URL http://www.jstatsoft.org/v21/i12/ .
rstatix	Alboukadel Kassambara (2021). rstatix: Pipe-Friendly Framework for Basic Statistical Tests. R package version 0.7.0. https://CRAN.R-project.org/package=rstatix

Table S2. Provided estimations of numbers of colonies and calculated extrapolations for 19 surveyed *Varroa* diagnosis and control methods in Europe. For abbreviations of *Varroa* control options, see table 1.

Cluster	Country	Bees	Colonies	Year of Estimation	Varr Monit	Ami Strip	OA_Trick I	Drone Remov	AmiF umig	OA_Sublim	BiotechMeth	FA_Short	Thy mol	Tauf luv	FA_L ong	AnotC hemPr	Flum eth	OA_MixTr	Anot Meth	Hypetherm	LacAcid	Cou mStrip	Cou mTri ck
I	England	29 000	126 000	2017	90 090	24 318	32 508	25 200	126	26 586	4 662	2 016	48 006	4 662	23 940	1 890	630	9 576	5 418	630	126	0	0
	France	56 773	1 453 605	2018	706 452	135 266	347 412	193 329	5 814	130 824	49 423	69 773	56 691	88 670	82 855	8 722	361	4 133	47 969	0	0	0	0
	Ireland	4 200	30 000	2018	20 040	9 180	2 640	3 150	30	10 500	390	120	14 460	30	2 190	30	150	30	840	90	60	90	0
	Northern Ireland	1 400	2 100	2018	1 598	708	683	389	0	634	25	21	939	40	479	11	0	32	103	0	0	0	0
	Portugal	11 883	767 650	2018	419 137	504 346	132 036	142 015	7 677	118 986	38 383	137 409	235 669	35 312	5 374	4 606	282	12 633	6 141	14 585	4 606	22 262	0
	Scotland	2 225	36 000	2020	24 948	14 472	9 720	11 088	144	11 556	396	360	5 508	1 044	4 500	504	504	900	1 440	36	360	0	0
	Spain	32 845	2 868 337	2018	2 713 447	492 585	705 611	714 216	54 498	869 106	209 389	183 574	217 994	68 840	34 420	401 567	80 313	94 655	71 708	126 207	0	14 342	0
	Wales	1 840	9 000	2020	6 399	243	1 431	1 656	0	2 169	927	243	1 512	549	2 493	90	0	99	495	0	0	0	0
II	Austria	30 237	390 607	2019	336 313	1 562	139 447	212 881	3 125	216 787	145 306	159 758	21 093	391	173 039	781	1 172	106 245	6 640	19 921	11 718	0	0
	Belgium	8 223	59 835	2018	35 422	7 779	27 105	26 627	0	15 737	11 428	933	8 078	718	975	898	3 710	6 881	8 975	838	658	419	180
	Bulgaria	17 156	867 561	2019	266 341	79 816	567 385	141 412	96 299	97 167	0	140 545	52 921	55 524	37 305	89 359	58 127	62 464	116 253	0	5 205	29 497	0
	Denmark	6 500	125 000	2020	48 500	875	109 000	66 750	0	6 500	1 250	250	17 000	0	50 500	125	13 125	125 000	2 1 125	4 125	0	0	0
	Estonia	5 215	49 300	2019	29 334	6 064	31 848	26 326	3 007	29 925	11 438	5 029	6 261	6 409	8 825	1 233	3 747	5 916	1 923	296	0	0	0
	Finland	3 200	83 000	2019	66 566	0	55 39 176	0	25 896	166	644	5 524	35 0	29 133	0	0	2 241	83	0	0	0	0	0
	Germany	160 000	1 100 000	2020	644 600	15 400	682 000	745 800	0	161 700	185 900	408 100	66 000	1 100	553 300	0	17 600	41 800	0	9 900	185 900	0	0
	Greece	9 022	789 907	2018	526 078	134 284	276 467	106 637	27 647	60 823	41 075	3 950	57 663	0	5 529	8 689	43 445	56 083	52 924	0	0	0	11 849
	Italy	56 665	1 579 666	2019	273 211	544 985	664 695	388 598	0	630 287	581 317	169 024	366 483	94 780	127 953	17 376	50 549	132 692	34 753	695 797	15 0	0	0
	Latvia	4 300	103 096	2019	28 970	8 351	46 806	61 033	887	20 207	6 083	145	8 577	2 093	3 701	10 516	29 382	39 795	3 918	722	928	103	103
	Netherlands	10 000	78 000	2020	36 972	5 772	34 788	33 072	468	11 388	5 148	19 734	12 948	390	15 054	1 482	5 460	9 204	2 184	546	858	0	0
	Norway	4 500	44 000	2019	30 228	0	31 284	21 032	0	1 232	0	804	0	0	308	0	0	704	0	0	4 268	0	0
	Slovenia	10 933	204 736	2019	156 623	34 191	123 456	165 222	81 690	105 849	33 986	69 815	14 536	0	36 648	7 780	15 150	5 528	1 228	3 685	685	001	0
	Sweden	16 500	174 000	2019	119 886	8 526	109 968	77 952	0	27 666	696	854	36 540	7 482	7 482	174	348	8 874	2 958	522	4 176	0	0
Switzerland	17 500	165 000	2014	114 015	0	62 205	107 910	0	108 735	26 235	120	7 260	0	135 630	0	990	0	2 805	990	0	165	0	
III	Czech Republic	60 330	686 627	2019	577 453	3 433	171 657	276 024	522 523	22 659	37 078	369 405	37 764	294 563	127 026	3 433	687	0	0	8 240	12 359	0	0
	North Macedonia	6 000	230 000	2020	89 010	33 580	128 800	73 600	81 800	74 750	17 250	25 070	39 330	25 070	8 050	690	17 480	0	11 730	1 380	0	31 510	79 120
	Poland	81 000	1 680 000	2019	370 880	534 240	525 840	987 840	207 920	196 560	470 400	139 440	119 280	0	179 760	307 440	216 720	0	322 560	30 240	0	0	0
	Romania	40 000	1 960 000	2019	726 760	415 520	337 120	811 440	293 600	288 120	607 600	182 160	164 640	160 160	135 240	168 800	156 209	156 800	194 200	145 040	103 880	31 360	31 360
	Serbia	10 000	1 250 000	2020	1 116 250	380 000	788 750	311 250	702 500	87 500	236 250	183 750	120 000	121 250	108 750	132 500	67 500	143 750	200 000	41 250	31 250	165 000	61 250
	Slovakia	20 050	336 700	2021	231 313	14 478	64 646	172 054	240 067	15 152	17 508	97 980	190 909	80 808	29 293	13 468	19 192	32 323	21 886	6 061	5 724	0	0
	Ukraine	254 000	2 540 000	2017	982 980	317 500	149 860	599 440	198 880	198 120	119 380	236 220	271 780	299 720	66 040	152 400	502 920	93 980	132 080	139 700	45 720	35 560	10 160
Cluster I	140 166	5 292 692		982 111	181 117	232 040	1 091 043	68 289	1 170 362	303 594	393 516	580 777	199 147	156 251	417 419	98 241	342 656	134 114	141 548	5 152	36 694	0	

Cluster II	359	5 813	3		3					1			1									
	951	708	713	847	362	2 220	215	1 519	1 050	109	704	169	196	138	242	482	236	62	237	56	12	
Cluster II	471	8 683	6	1	2		5			1		1										
	380	327	094	698	146	3 231	247	882	1 505	234	943	646	654	778	981	479	882	371	198	263	181	
Total	971	19 789	13	6	6	6 543	530	3 573	2 859	737	229	015	006	1 334	322	304	253	575	441	356	194	
	497	727	816	472	942	119	552	119	088	365	365	604	792	322	344	982	054	698	404	309	021	

Table S3. Respondents per European country who applied 0*, 1 or multiple different *Varroa* control options during April 2019 and March 2020;
 0* stands for "no answer" or "no treatment"; responses for *Varroa* monitoring excluded from calculations.

Country	Respondents	0*	1	2	3	4	5	6	≥7
Austria	1 453	20 (1.4 %)	82 (5.6 %)	394 (27.1 %)	521 (35.9 %)	313 (21.5 %)	109 (7.5 %)	14 (1.0 %)	0 (0.0 %)
Belgium	564	72 (12.8 %)	111 (19.7 %)	159 (28.2 %)	138 (24.5 %)	71 (12.6 %)	9 (1.6 %)	3 (0.5 %)	1 (0.2 %)
Bulgaria	51	4 (7.8 %)	15 (29.4 %)	23 (45.1 %)	7 (13.7 %)	0 (0.0 %)	1 (2.0 %)	1 (2.0 %)	0 (0.0 %)
Czech Republic	1 729	88 (5.1 %)	169 (9.8 %)	588 (34.0 %)	537 (31.1 %)	253 (14.6 %)	79 (4.6 %)	11 (0.6 %)	4 (0.2 %)
Denmark	1 087	18 (1.7 %)	80 (7.4 %)	308 (28.3 %)	617 (56.8 %)	54 (5.0 %)	10 (0.9 %)	0 (0.0 %)	0 (0.0 %)
England	1 262	233 (18.5 %)	461 (36.5 %)	402 (31.9 %)	133 (10.5 %)	25 (2.0 %)	5 (0.4 %)	3 (0.2 %)	0 (0.0 %)
Estonia	178	5 (2.8 %)	32 (18.0 %)	44 (24.7 %)	49 (27.5 %)	34 (19.1 %)	10 (5.6 %)	4 (2.2 %)	0 (0.0 %)
Finland	215	22 (10.2 %)	10 (4.7 %)	60 (27.9 %)	110 (51.2 %)	12 (5.6 %)	1 (0.5 %)	0 (0.0 %)	0 (0.0 %)
France	1 030	140 (13.6 %)	643 (62.4 %)	188 (18.3 %)	46 (4.5 %)	10 (1.0 %)	2 (0.2 %)	0 (0.0 %)	1 (0.1 %)
Germany	10 610	1 091 (10.3 %)	669 (6.3 %)	2 234 (21.1 %)	4 129 (38.9 %)	1 915 (18.0 %)	498 (4.7 %)	73 (0.7 %)	1 (0.0 %)
Greece	170	47 (27.6 %)	74 (43.5 %)	39 (22.9 %)	9 (5.3 %)	0 (0.0 %)	1 (0.6 %)	0 (0.0 %)	0 (0.0 %)
Ireland	375	79 (21.1 %)	165 (44.0 %)	108 (28.8 %)	18 (4.8 %)	5 (1.3 %)	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)
Italy	364	35 (9.6 %)	41 (11.3 %)	125 (34.3 %)	80 (22.0 %)	62 (17.0 %)	12 (3.3 %)	6 (1.6 %)	3 (0.8 %)
Latvia	364	26 (7.1 %)	91 (25.0 %)	122 (33.5 %)	87 (23.9 %)	31 (8.5 %)	2 (0.5 %)	4 (1.1 %)	1 (0.3 %)
Netherlands	1 857	420 (22.6 %)	305 (16.4 %)	534 (28.8 %)	465 (25.0 %)	113 (6.1 %)	17 (0.9 %)	3 (0.2 %)	0 (0.0 %)
North Macedonia	217	11 (5.1 %)	27 (12.4 %)	68 (31.3 %)	50 (23.0 %)	47 (21.7 %)	13 (6.0 %)	1 (0.5 %)	0 (0.0 %)
Northern Ireland	117	11 (9.4 %)	34 (29.1 %)	48 (41.0 %)	20 (17.1 %)	2 (1.7 %)	2 (1.7 %)	0 (0.0 %)	0 (0.0 %)
Norway	765	175 (22.9 %)	241 (31.5 %)	274 (35.8 %)	68 (8.9 %)	6 (0.8 %)	0 (0.0 %)	1 (0.1 %)	0 (0.0 %)
Poland	426	7 (1.6 %)	40 (9.4 %)	136 (31.9 %)	126 (29.6 %)	80 (18.8 %)	25 (5.9 %)	6 (1.4 %)	6 (1.4 %)
Portugal	125	23 (18.4 %)	48 (38.4 %)	27 (21.6 %)	17 (13.6 %)	5 (4.0 %)	3 (2.4 %)	1 (0.8 %)	1 (0.8 %)
Romania	121	5 (4.1 %)	25 (20.7 %)	31 (25.6 %)	27 (22.3 %)	15 (12.4 %)	10 (8.3 %)	2 (1.7 %)	6 (5.0 %)
Scotland	292	36 (12.3 %)	93 (31.8 %)	116 (39.7 %)	39 (13.4 %)	6 (2.1 %)	1 (0.3 %)	1 (0.3 %)	0 (0.0 %)
Serbia	125	0 (0.0 %)	9 (7.2 %)	45 (36.0 %)	43 (34.4 %)	14 (11.2 %)	7 (5.6 %)	4 (3.2 %)	3 (2.4 %)
Slovakia	548	49 (8.9 %)	48 (8.8 %)	118 (21.5 %)	158 (28.8 %)	112 (20.4 %)	49 (8.9 %)	10 (1.8 %)	4 (0.7 %)
Slovenia	105	4 (3.8 %)	0 (0.0 %)	19 (18.1 %)	35 (33.3 %)	35 (33.3 %)	8 (7.6 %)	4 (3.8 %)	0 (0.0 %)
Spain	156	4 (2.6 %)	57 (36.5 %)	56 (35.9 %)	30 (19.2 %)	6 (3.8 %)	2 (1.3 %)	1 (0.6 %)	0 (0.0 %)
Sweden	1 646	131 (8.0 %)	411 (25.0 %)	704 (42.8 %)	347 (21.1 %)	45 (2.7 %)	7 (0.4 %)	1 (0.1 %)	0 (0.0 %)

Switzerland	1 665	5 (0.3 %)	65 (3.9 %)	466 (28.0 %)	925 (55.6 %)	167 (10.0 %)	34 (2.0 %)	3 (0.2 %)	0 (0.0 %)
Ukraine	702	66 (9.4 %)	272 (38.7 %)	198 (28.2 %)	105 (15.0 %)	35 (5.0 %)	15 (2.1 %)	4 (0.6 %)	7 (1.0 %)
Wales	90	27 (30.0 %)	35 (38.9 %)	19 (21.1 %)	6 (6.7 %)	3 (3.3 %)	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)

Table S4. Number of respondents and total coumaphos usage (either trickling or in strips) in Northern Macedonia in the years 2014/15 to 2020/21.

Season	No. of responses	Percentage of beekeepers applying coumaphos
2014/2015	190	0.00
2015/2016	296	2.70
2016/2017	320	1.56
2017/2018	171	1.75
2018/2019	115	2.61
2019/2020	217	30.73
2020/2021	151	4.64

Could you please indicate the months when you monitored your production colonies for Varroa AND also indicate when you STARTED a Varroa treatment or management plan during the period April 2018 - April 2019?

	Apr 19	May 19	June 19	July 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
Monitoring of Varroa infestation level (e.g. counting mite fall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drone brood removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hyperthermia (heat treatment of brood/bees)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other biotechnical method (as e.g. trapping comb, complete brood removal, queen confinement)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formic acid - short term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formic acid - long term (e.g. MAQS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lactic acid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxalic acid - trickling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxalic acid - sublimation (evaporation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxalic acid mixtures (e.g. Hiveclean/Bienenwohl/Varromed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thymol (e.g. Apiguard, ApilifeVar)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tau-fluvalinate (e.g. Apistan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flumethrin (e.g. Bayvarol, Polyvar)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amitraz (in strips, e.g. Apivar, Apitraz)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amitraz (Verdampfen)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coumaphos (e.g. Perizin)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coumaphos (in strips, e.g. Checkmite+)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another chemical product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ⓜ If you have used the same method over several months, state only the first month.

Figure S1. Varroa matrix question used in the study.

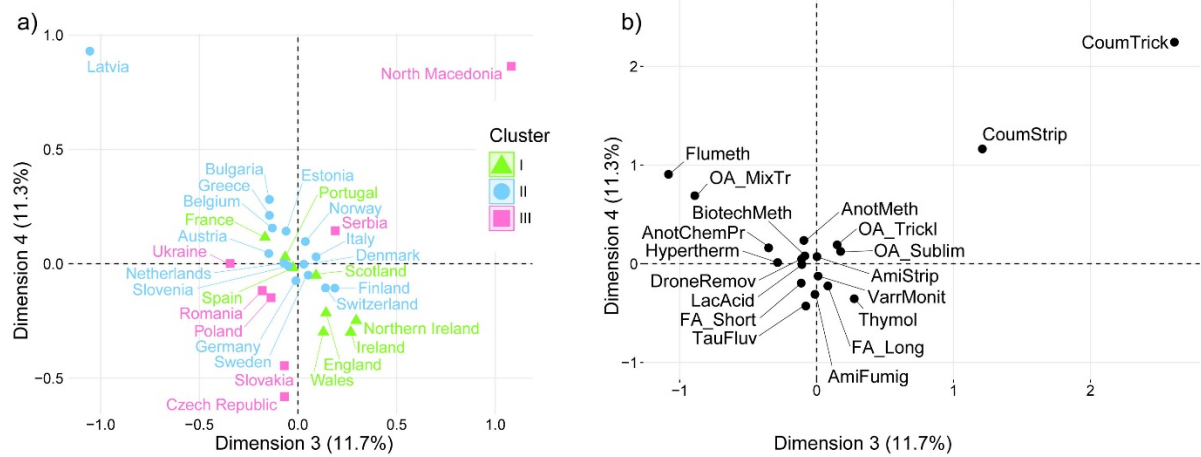


Figure S2. Third and fourth dimension of correspondence analysis of *Varroa* diagnosis and control methods in Europe based on respondent data. a) Factor map of 30 countries and the three clusters they form. b) All 19 factors (*Varroa* control methods). For abbreviations of *Varroa* control options, see table 1.

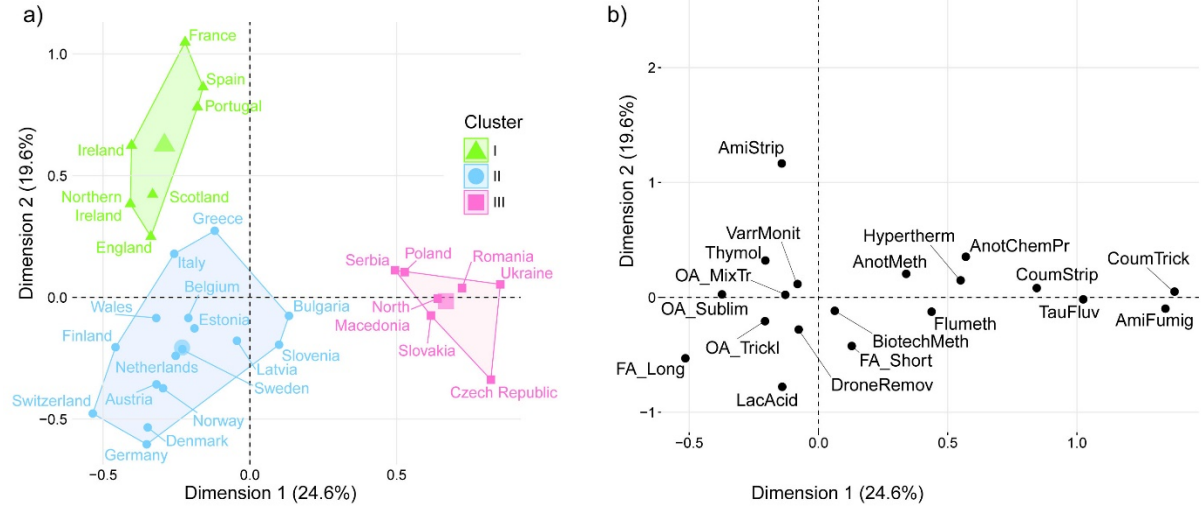


Figure S3. Correspondence analysis of *Varroa* diagnosis and control methods in Europe based on colony data. a) Factor map of 30 countries and the three clusters they form. b) All 19 factors. For abbreviations of *Varroa* control options, see table 1.

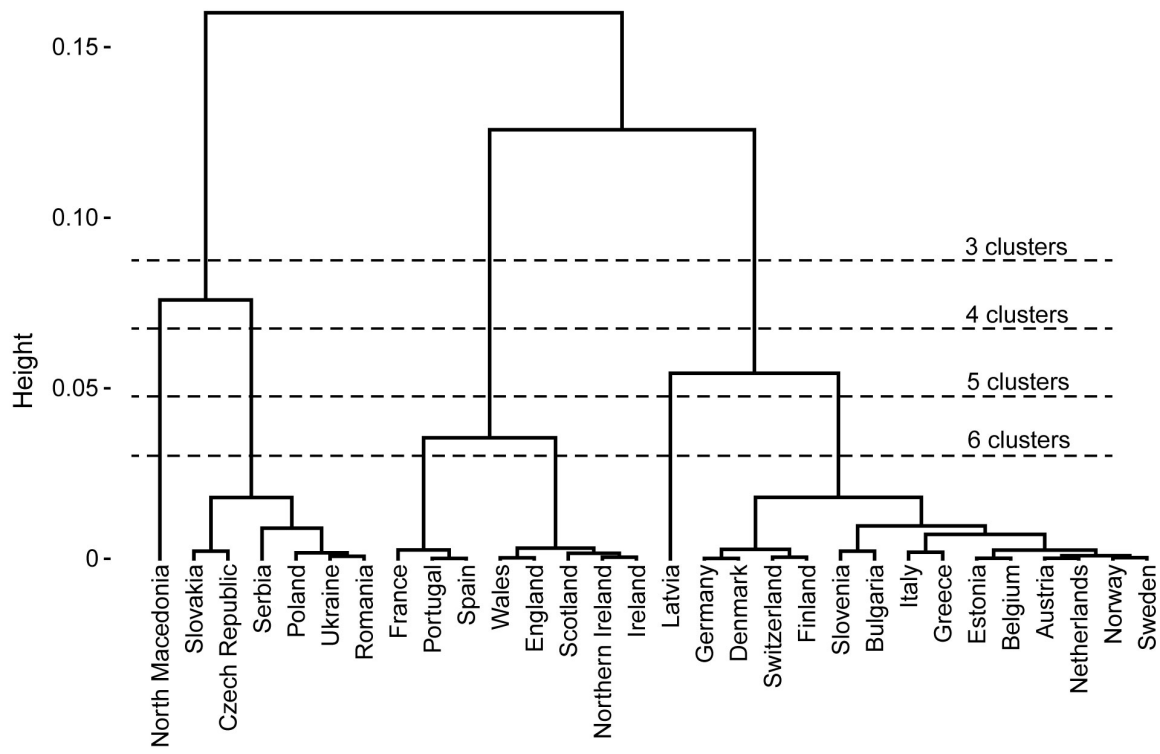


Figure S4. Dendrogram of agglomerative hierarchical clustering conducted on components of correspondence analysis. Dashed lines mark different numbers of clusters and their compositions.

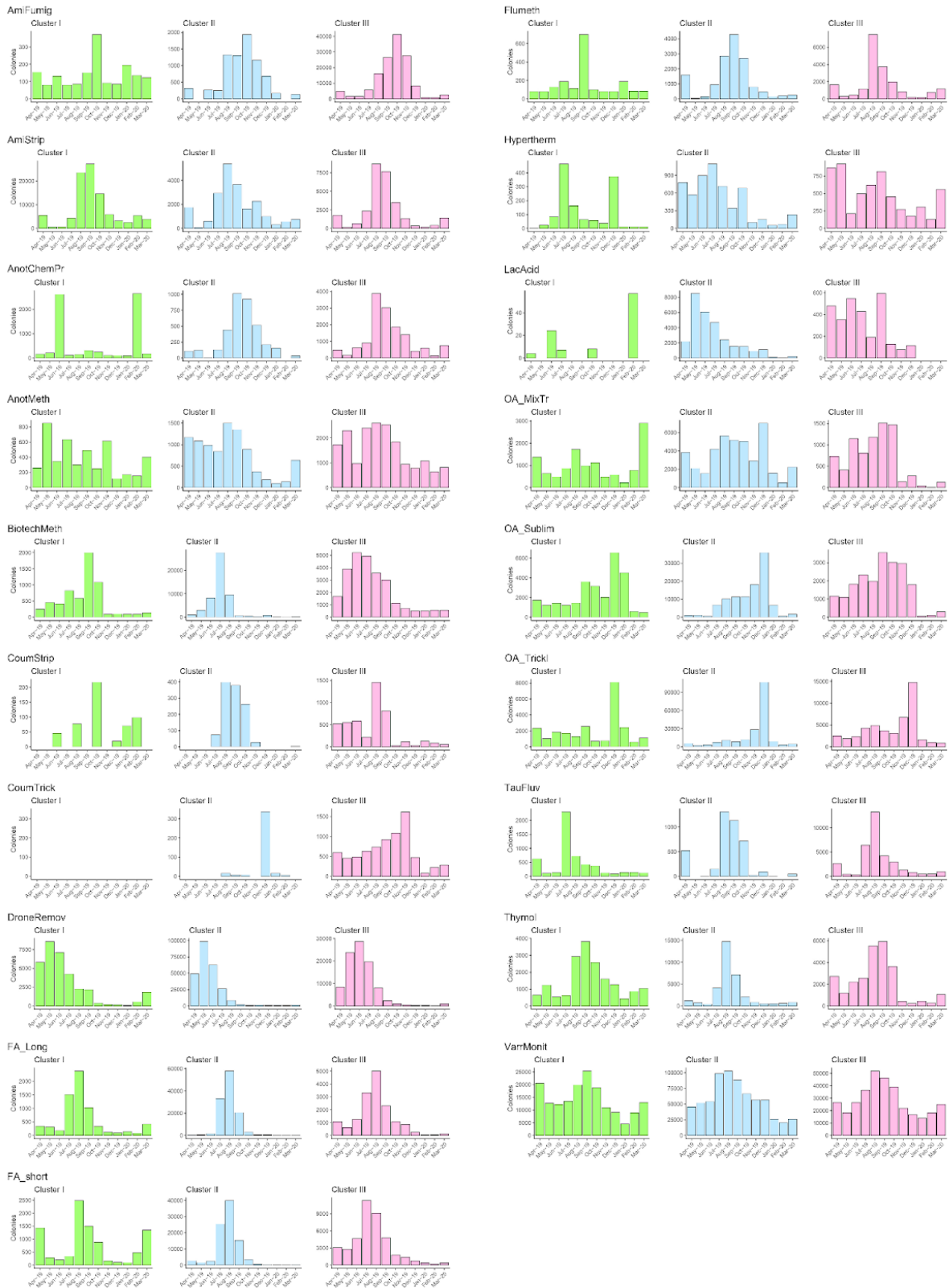


Figure S5. Temporal dynamics of application of *Varroa* diagnosis and control methods. Count of colonies treated with respective control options in a certain month for the three different clusters are shown. For abbreviations of *Varroa* control options, see table 1.

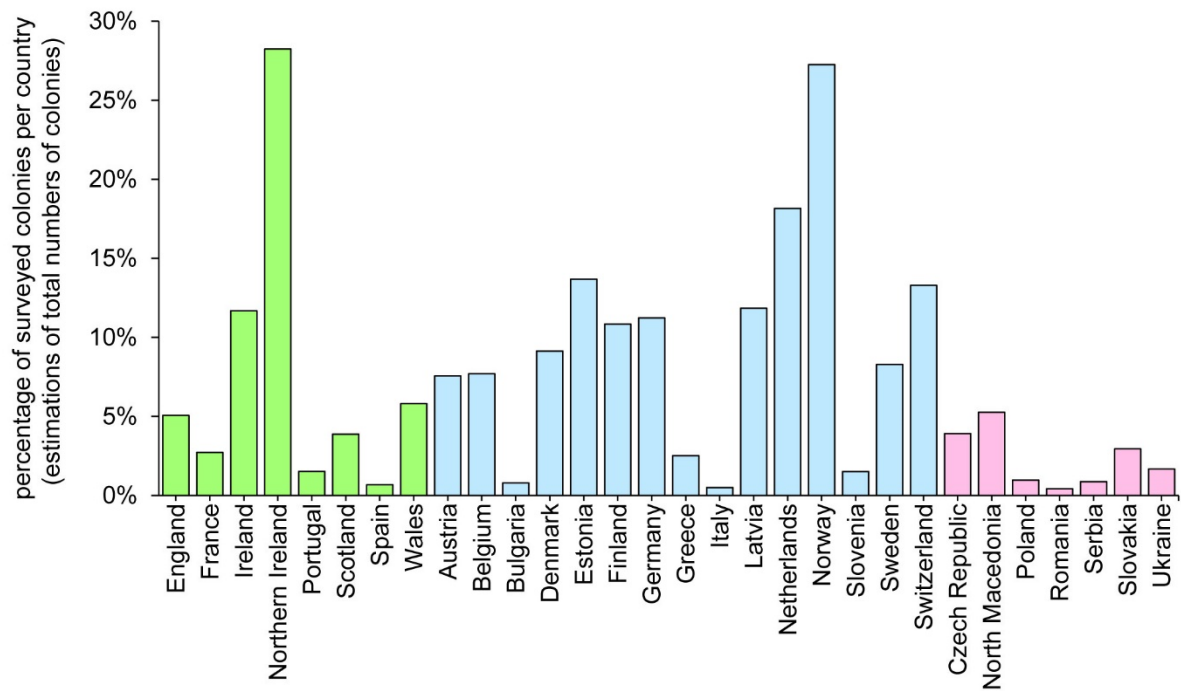


Figure S6. Proportion of surveyed colonies. The percentage of surveyed colonies in a participating country is shown. The calculations are based on estimations of existing numbers of colonies provided by national coordinators.