Bees: Syngenta: testing, risk assessment and its wider involvement in pollinator solutions

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Content of talk

- Pollen and nectar hive residue analysis surveys and link to biology
- Potential causes of bee decline
- Neonicotinoids and bees
    - Critique of Henry *et al*. (2012)
    - New Syngenta data
- Syngenta's involvement in other areas of bee health

Residue analysis improves

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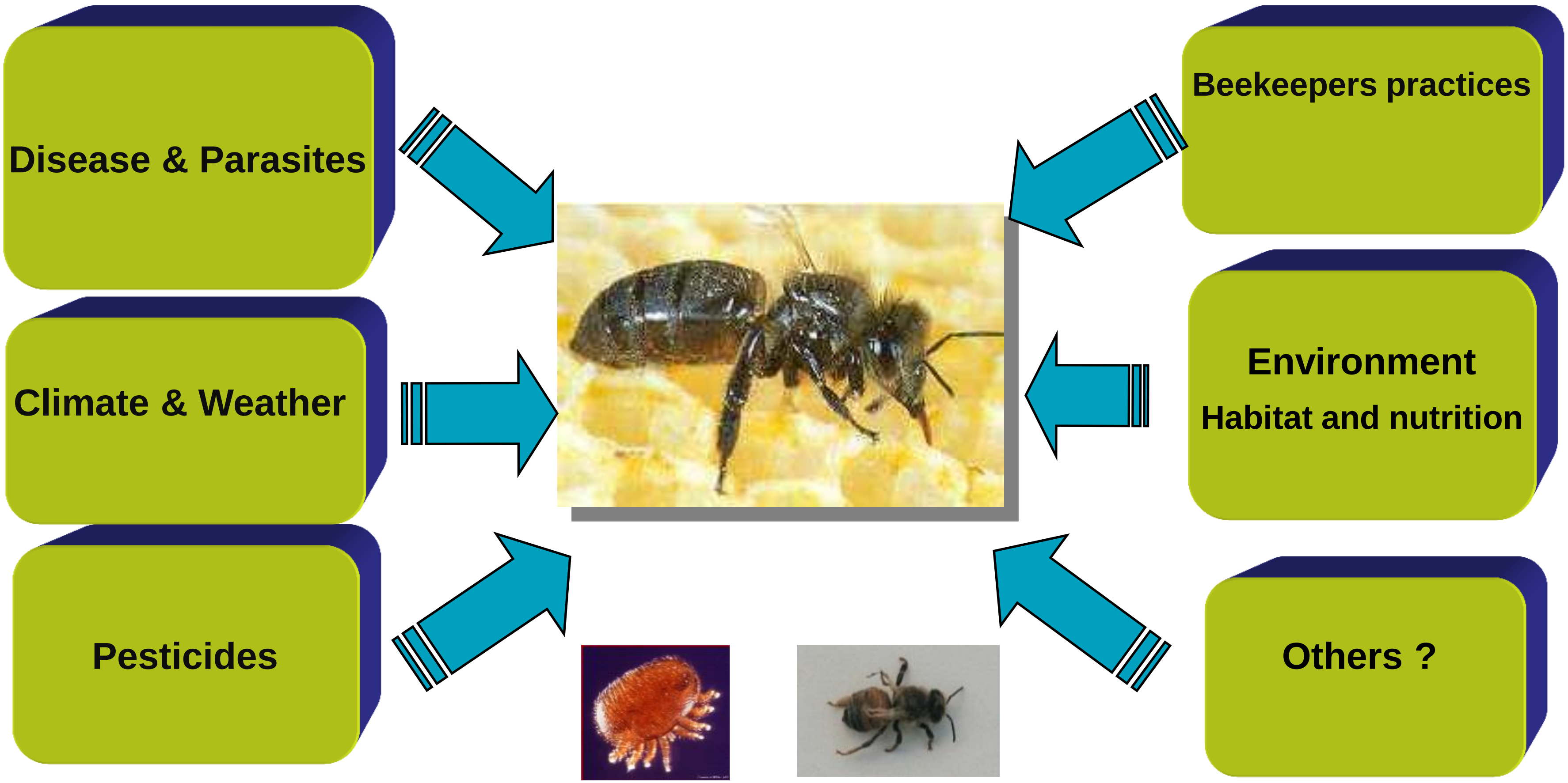
Many in- hive residue surveys e.g. Mullin *et al.* (2010)

Table 2

Summary of pesticide detections in pollen samples from North American honey bee colonies.

Pollen Pesticide*	Class#	Detects	Samples	%	Detections (ppb)							
					High	Low	Median	90%tile	95%tile	Mean§	SEM§	LOD†
Fluvalinate	PYR	309	350	88.3	2670.0	1.6	40.2	186.8	323.0	95.1	12.6	1.0
Coumaphos	OP	263	350	75.1	5828.0	1.0	13.1	518.4	892.0	180.4	33.0	1.0
Chlorpyrifos	OP	153	350	43.7	830.0	0.1	4.4	140.4	226.5	53.3	10.6	0.1
Chlorothalonil	FUNG	148	280	52.9	98900.0	1.1	35.0	9939.0	18765.0	3014.8	880.9	1.0
Pendimethalin	HERB	113	247	45.7	1730.0	1.1	13.4	72.9	129.8	44.6	15.7	1.0
Endosulfan I	CYC	98	350	28.0	76.7	0.4	4.2	33.9	47.2	10.9	1.5	0.1
Endosulfan sulfate	CYC	92	350	26.3	35.0	0.2	2.2	9.2	11.3	4.3	0.6	0.1
DMPF (amitraz)	FORM	77	247	31.2	1117.0	6.1	75.0	360.2	615.0	147.9	23.5	4.0
Atrazine	S HERB	71	350	20.3	49.0	4.2	8.9	27.0	35.2	13.6	1.1	1.0
Endosulfan II	CYC	70	350	20.0	67.7	0.1	3.8	24.7	39.6	9.1	1.6	0.1
Fenpropathrin	PYR	63	350	18.0	170.0	0.4	7.0	24.6	60.8	15.1	3.3	0.4
Azoxystrobin	S FUNG	53	350	15.1	107.0	1.0	10.2	58.9	68.1	21.0	3.3	1.0
Metolachlor	PS HERB	52	350	14.9	103.0	2.6	8.1	19.4	44.6	13.4	2.5	2.0
Captan	FUNG	45	350	12.9	10000.0	16.0	103.0	571.8	663.2	433.5	219.9	10.0
Esfenvalerate	PYR	41	350	11.7	59.6	1.0	3.3	10.0	47.5	7.8	2.2	0.5
Carbaryl	PS CARB	38	350	10.9	1010.0	13.6	36.7	269.5	602.9	117.1	36.5	5.0
Cyhalothrin	PYR	38	350	10.9	28.0	0.1	1.7	4.3	18.2	3.4	0.9	0.1
THPI (captan)	PS FUNG	35	247	14.2	363.0	60.1	227.0	312.0	342.0	205.8	15.1	30.0
Methoxyfenozide	IGR	29	350	8.3	128.0	0.4	22.3	96.4	111.2	35.0	7.1	0.4
Dicofol	OC	28	350	8.0	143.0	0.4	8.1	60.3	85.7	23.2	6.4	0.4
Trifloxystrobin	PS FUNG	27	350	7.7	264.0	0.6	10.3	96.2	168.4	34.1	11.9	0.5

Bee Health Decline – Many Suggested Potential Causes



- Experts view is losses caused by <u>combination</u> of stressors
- In particular, *Varroa destructor* mites & associated viruses e.g. DWV
- But Academics & Media have focussed on Pesticides

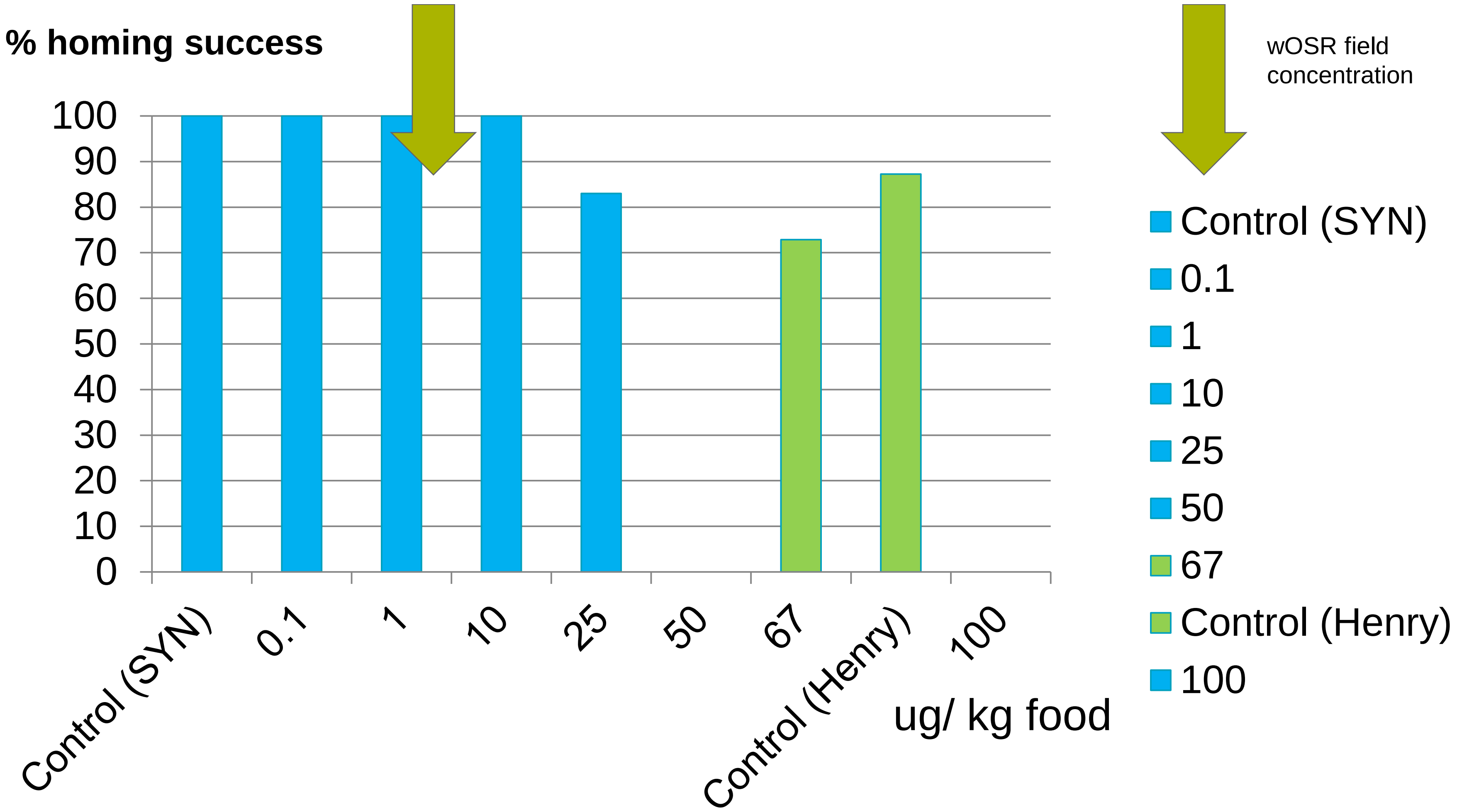
Henry *et al.*, 2012: A common pesticide decreases foraging success and survival in honey bees. *Science* - March 2012

Bees treated with TMX took significantly more time to return to their hives than untreated bees and then using a honey bee population model predicted colony level effects

513 citations to date

(Schneider *et al.* (2012): 111 citations to date)

Comparison of Henry *et al* (2012) findings with internal Syngenta study



“Homing” conclusions- Henry *et al*.

- Findings are consistent with, if in fact not more favorable, than findings from 1999 Syngenta internal study
- The concentration used in these studies is 36 times greater than the average concentration of TMX measured in nectar and pollen from fields of winter oil seed rape treated with thiamethoxam.
- This very high dose was administered in a very short timescale of 1-2 hours and was attempting to mimic a total daily dose.
- The model and input parameters used to predict colony collapse were criticised in published comment by Cresswell & Thompson (*Science* – Sept 2012) as being not developed or mature enough to use to inform regulatory risk assessment, which was accepted by Henry *et al* in their published response (*Science* – Sept 2012).
- Additionally challenged by Guez (2013) in Frontiers in Physiology

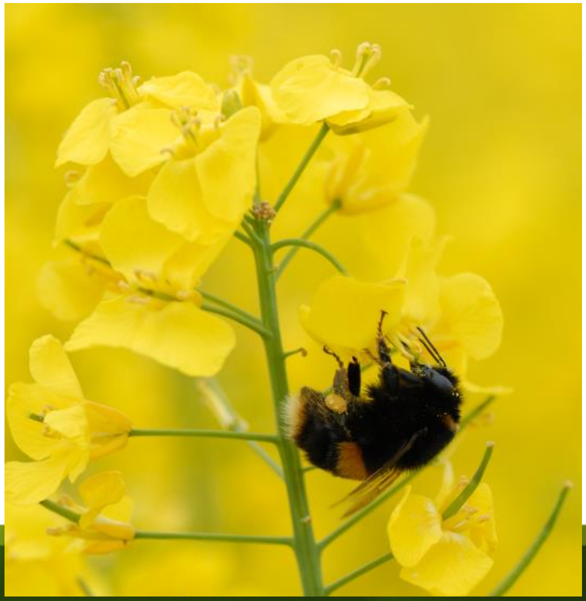
The results of this study do not reflect the real exposure and risk to bees in the field

New Syngenta thiamethoxam data

Solitary Bee Field Studies

Honey Bee RFID Field Study

Bumble Bee Field Study



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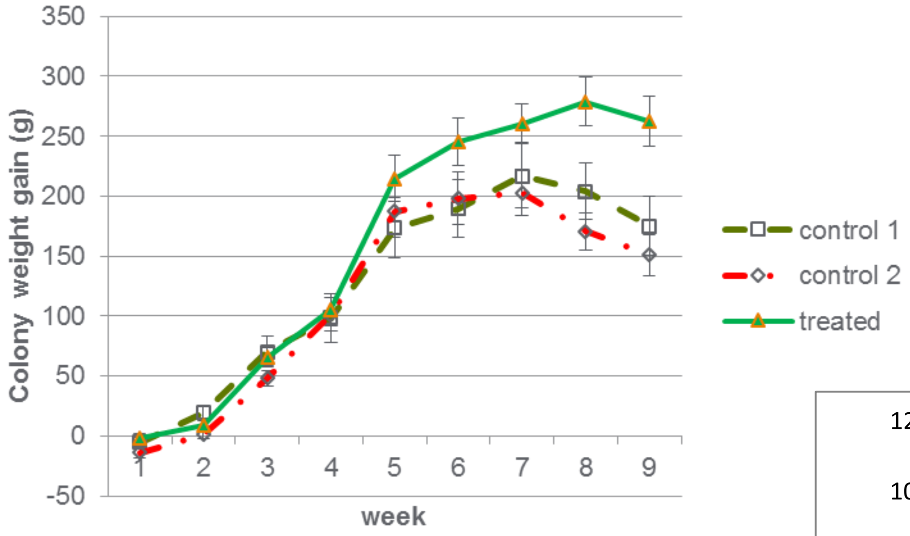
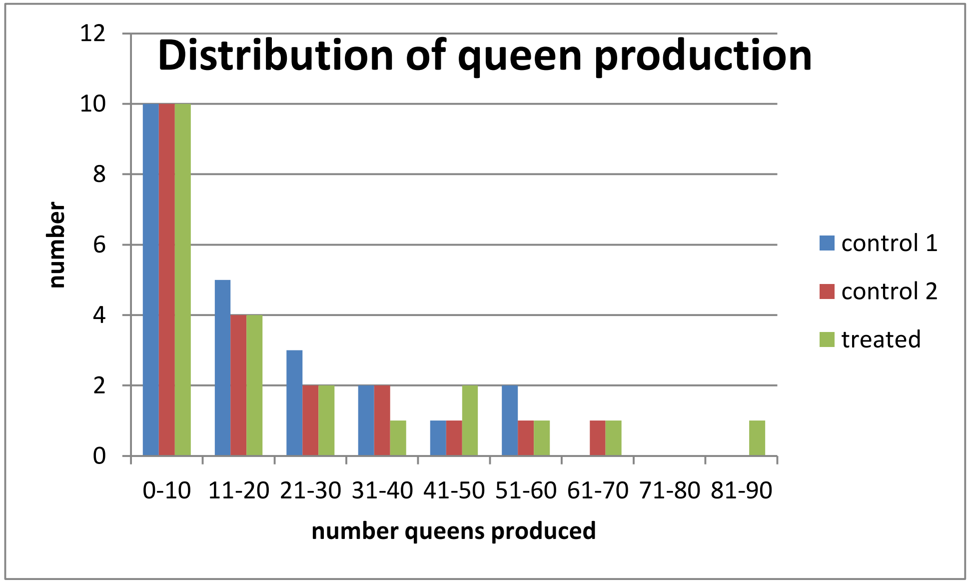
Thompson *et al*., 2016. Monitoring the effects of thiamethoxam applied as a seed treatment to winter oil seed rape on the development of bumble bee (*Bombus terrestris*) colonies





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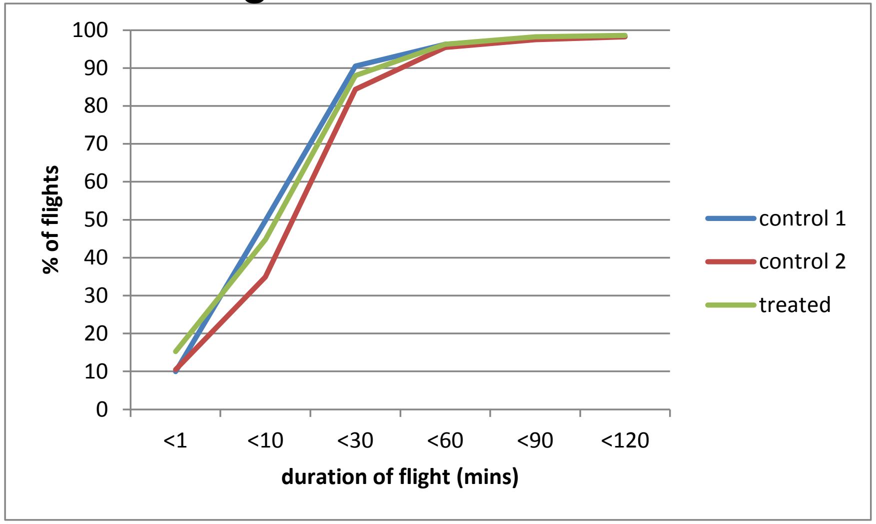
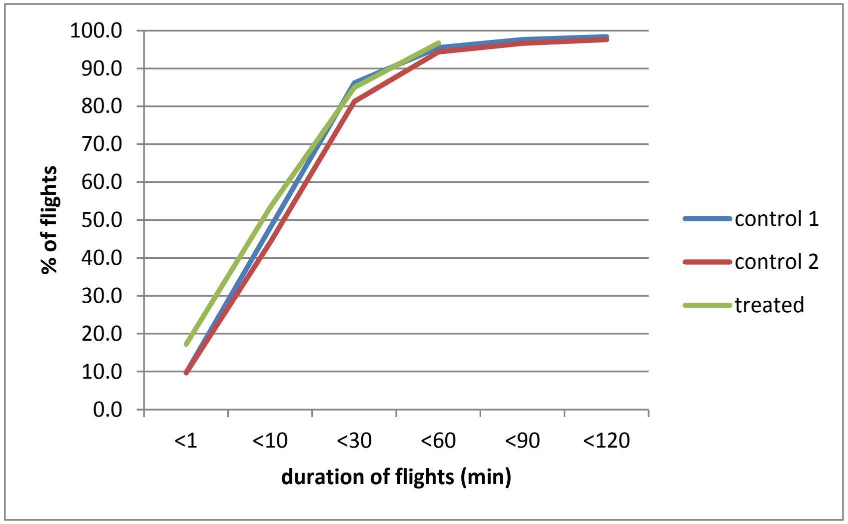
Thompson H., Coulson M., Ruddle N., Wilkins S., Harkin S., 2015. Thiamethoxam: Assessing flight activity of honey bees foraging on treated oilseed rape using RFID technology. Environ. Toxicol. Chem. http://dx.doi.org/10.1002/etc.3183.

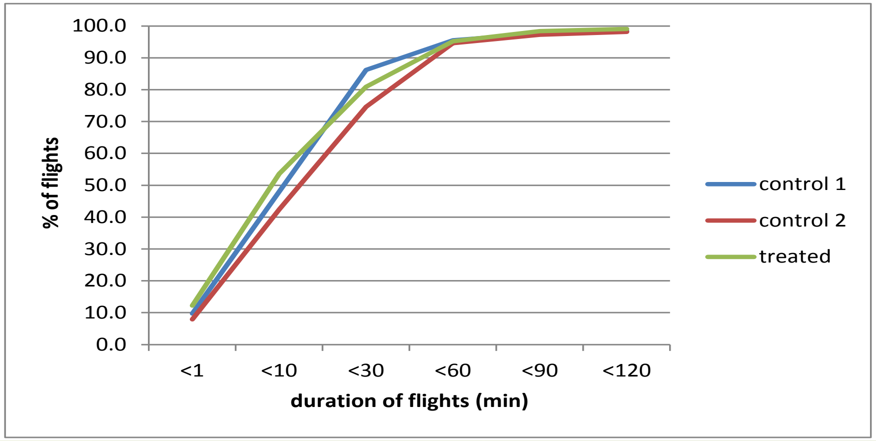
Field edge



0.5 km from field

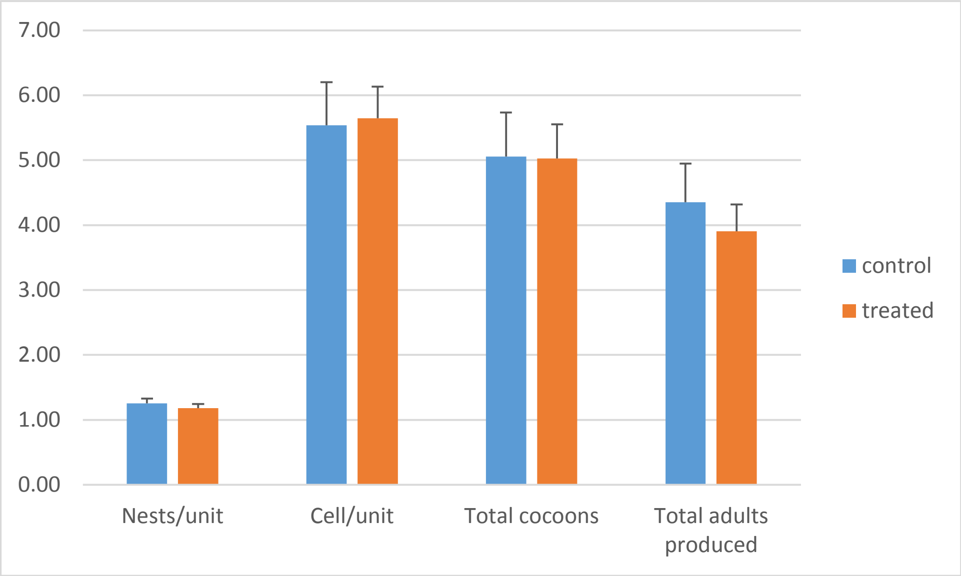


1 km from field



<u>Syngenta unpublished.</u> Effect of thiamethoxam applied as a seed treatment to Solitary bees (*Osmia bicornis*) foraging on Winter Oil Seed Rape

Results from tunnel experiment



Towards Multifunctional Margins

Bees and other pollinators

Biodiversity

Quality of water

Improvement of soil

Best use of resources

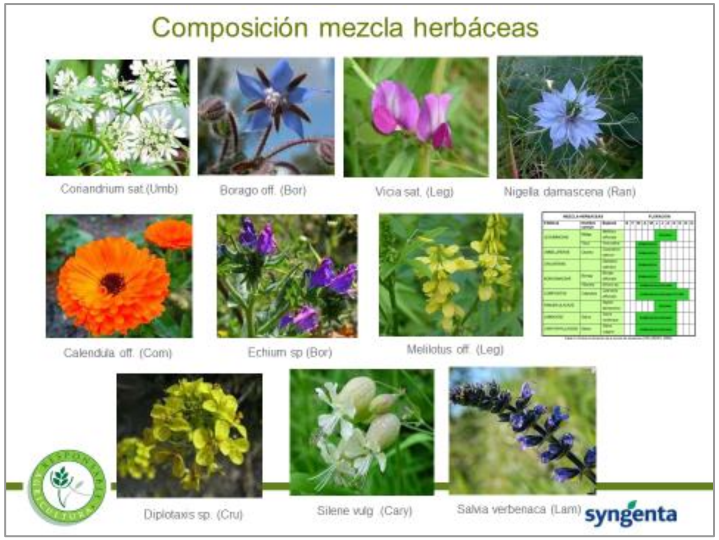
the good growth plan

OperationPollinator®
Multifunctional Landscapes

Syngenta contributions to bee health: Providing Solutions

OperationPollinator®
Multifunctional Landscapes

- Selection of species with a high pollination efficiency and adaptability to different environments in Iberia.
- Selected in collaboration with prestigious Scientific Institutions (ETSIA, CSIC and IMIDA).
- Proven benefits to pollinators and other arthropod species.



Syngenta contributions to bee health: Forage and habitat availability

Agreements with Farmer Organizations to promote Multifunctional Margins

ASAJA Sevilla

- Successful results in a two year period (2015-16)
- 1,500 Ha of Multifunctional Covers in olive (49,000 Kg of seed mix supplied).
- 100 Has of Multifunctional margins in Extensive Crops.

ELO – WildLife Estates

- integration of Operation Pollinator in WildLife Estates Label.
- 40 Ha of Multifunctional Margins in 2016.
- Program to expand up to 200 ha by 2020.

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Syngenta contributions to bee health: Providing Information

Field Guide of Spanish Pollinators, articles, papers and web page

Información general
PHYTOMA

Imprescindible la implicación de la Administración para que se implante entre los agricultores

Universidad y CSIC avalan la apuesta por la biodiversidad de la Operación Polinizador

El pasado mes de mayo se realizó en la Finca del CSIC La Poveda, en Arganda del Rey (Madrid), una Jornada para evaluar los primeros resultados de los ensayos de la denominada Operación Polinizador, una iniciativa europea liderada por la compañía Syngenta que pretende potenciar la aparición de polinizadores en nuestros campos, dedicando los márgenes de los cultivos a la plantación de praderas que favorecen el desarrollo de estos insectos. Diversos catedráticos y científicos implicados en estos ensayos valoraron muy positivamente esta acción, pero dejaron claro que sin el apoyo de la administración a los agricultores para que *"cultiven biodiversidad"* no se podrán extender estas buenas prácticas medioambientales.

La Operación Polinizador se puso en marcha en 2009 en varios países de Europa con el fin de estudiar cómo fomentar la aparición de polinizadores: la idea es que con una correcta planificación y estudio de las praderas ideales para fomentar la aparición y el desarrollo de insectos polinizadores y destinando un pequeño porcentaje de las parcelas dedicadas a los cultivos (entre el 2 y el 6%) a este tipo de praderas (normalmente en los lindes del cultivo), se puede aumentar la biodiversidad, ayudar a la sostenibilidad de los cultivos y ser productivos y eficientes en el uso de los recursos naturales.

España es uno de los países europeos donde se está llevando a cabo esta iniciativa, liderada por la compañía Syngenta Agro y que cuenta con la colaboración de centros de investigación, industria agroalimentaria y agricultores. En concreto, existen ya cinco fincas donde se está experimentando: una en Madrid sobre cebada, una en Málaga sobre olivar, dos en Murcia sobre lechuga y hortícolas de hoja y una en Almería sobre hortícolas. Este pasado mes de mayo

Thank you for your attention and questions?