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EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

WG-5 Phenotyping systems

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Objectives

- Compare **breeding practices** and solutions across species regarding **phenotyping** of batches or individually identified selection candidates
- Develop protocols for **high-throughput** (individual or group) phenotyping
- Develop **non-invasive** (or minimal invasive) phenotyping methods

This year activities

- Bi-Monthly meetings
  - Presentations
  - Discussed phenotypes that are currently collected
- Made an overview of phenotypes available (next slide)

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Overview of phenotypes available

Trait group	Trait definition	Species	Scientific naming	Level (individual/group/population	Method	Technology
Production						
	Larval size					
	Larval weight	Black soldier fly	*Hermetia illucens*		Prediction from surface area	Computer vision, machine learning
		Yellow mealworm	*Tenebrio molitor*	measured as group of 50 or 100 but presented as individual Measured at familial level	Counting and weighting	Scale
	Larval surface area	House fly	*Musca domestica*	Individual	Surface area from pixels	Computer vision, Noldus EthoVision XT
		Black soldier fly	*Hermetia illucens*	Individual	Surface area from pixels	Computer vision, Noldus EthoVision XT
		Black soldier fly	*Hermetia illucens*	Individual	Surface area from pixels	Computer vision
	Harvest size					
	Harvest stage	Yellow mealworm	*Tenebrio molitor*	1st pupae appearance (lab scale experiments) or 10% of pupae (large-scale experiments)		
	Larval length	Black soldier fly	*Hermetia illucens*	Individual		Computer vision, machine learning
	Larval width	Black soldier fly	*Hermetia illucens*	Individual		Computer vision, machine learning
	Larval development stage					
	Larval developmental stage	Black soldier				
	Feed intake	Black soldier				
	Growth indexes (FCR, ECI, ECD, SGR, ECR)	Yellow meal				

Trait group	Trait definition	Species	Level (individual/group/colony)	Method	Technology	source of reference	Reference (with link)	Com
colony strength								
	# of bees	Honey bee	Colony	visual observation on field			https://www.tandfonline.com/doi/pdf/10.3896/IBRA.1.52.1.03	
	brood cells	Honey bee	Colony	visual observation with rul	Computer-assisted digital image analysis		https://www.tandfonline.com/doi/pdf/10.3896/IBRA.1.52.1.03	
	pollen cells							
	fecundity	Honey bee	Colony	observation on brood frame			https://www.tandfonline.com/doi/full/10.1080/00218839,	Que the l prod The can A sin 5 × 5 estin https
behaviour								
	gentleness	Honey bee		observation solitary bees			https://www.tandfonline.com/doi/full/10.1080/00218839.2023.	
	swarming tendency							
	grooming behaviour							
	hygienic behaviour	Honey bee	Colony	observation on capped-brood frame			https://www.tandfonline.com/doi/full/10.1080/00218839,	1)Fre
	Varroa sensitive hygienic	Honey bee	Colony	observation on capped-brood frame			https://doi.org/10.1038/srep10454, https://www.tandfonline.	
production traits								
	disease resistance	Honey bee	Colony	observation on capped-brood frame			https://doi.org/10.1051/apido/2010011, https://doi.org/1	Varr
	abiotic factor resistance							
	survival	Honey bee	Colony	observation (monitoring: counting frames-full of honey bees or laboratory testing in climatic chamber)				Wint

- More input is welcome!

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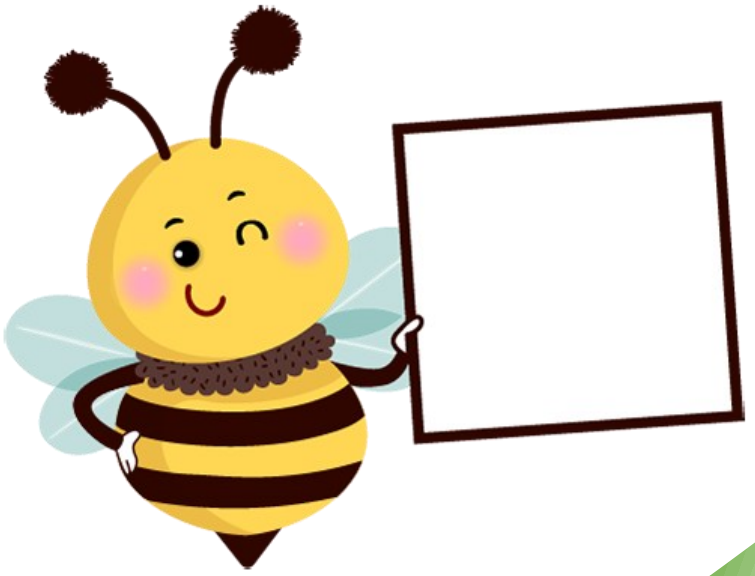
Next steps

- Continue Bi-monthly meetings topics:

Planned output:

- Develop protocols for high throughput phenotyping
- Presentations at conferences
- Review paper?



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Thank you!

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