



Temporal and spatial variation in avocado flower-visitors, pests and predators detected using environmental DNA and digital video recordings.



Paul Nevill

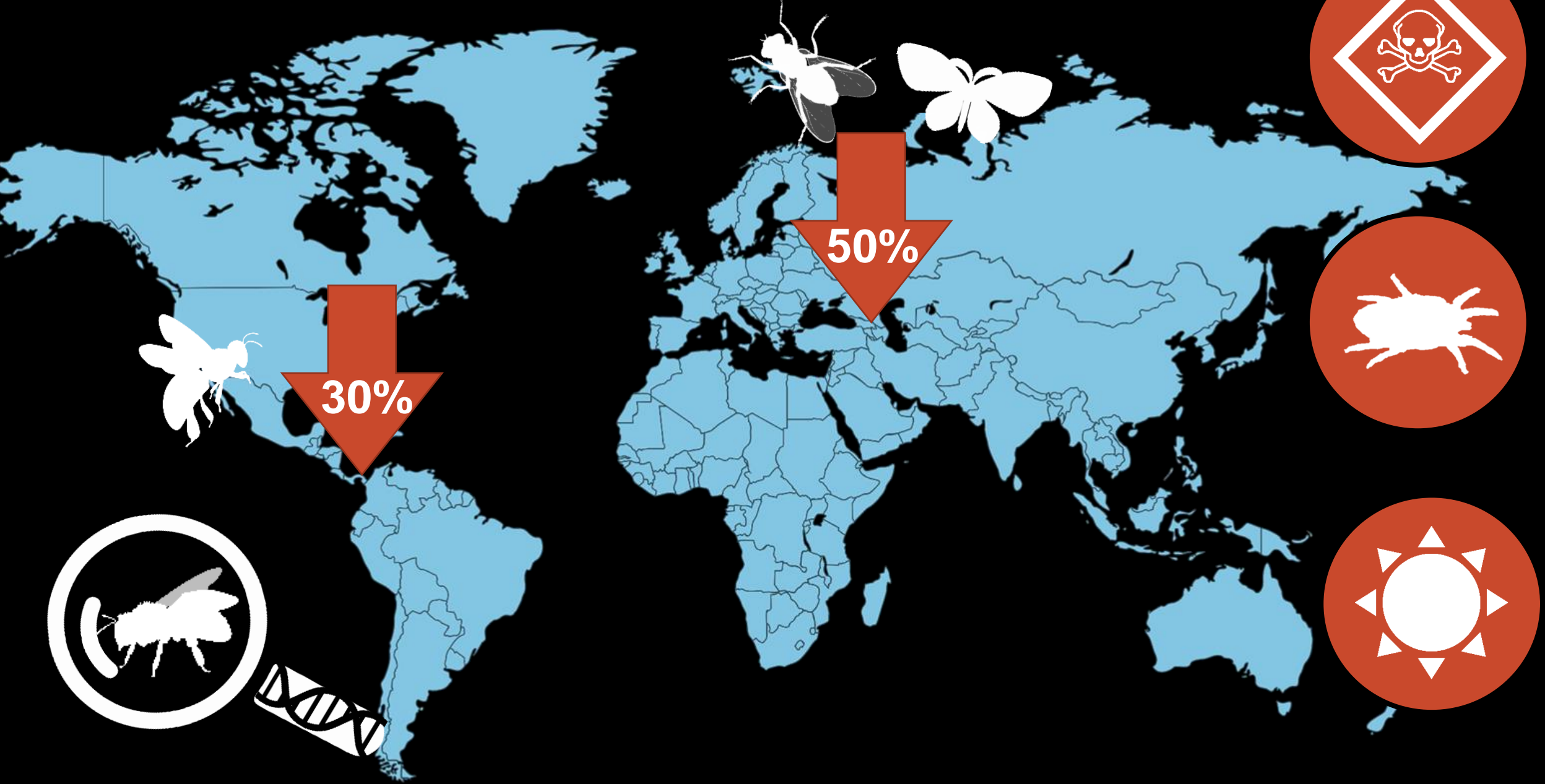
** Joshua Kestel, David Field, Nicole White, Bill Bateman

MBioMe
Mine site Biodiversity Monitoring with eDNA

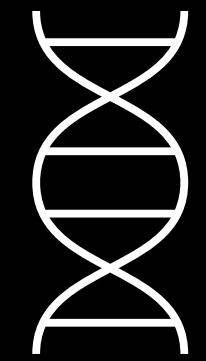


I would like to acknowledge the traditional owners of the land where this study was conducted and whose country we are meeting on today.

Global pollinator declines

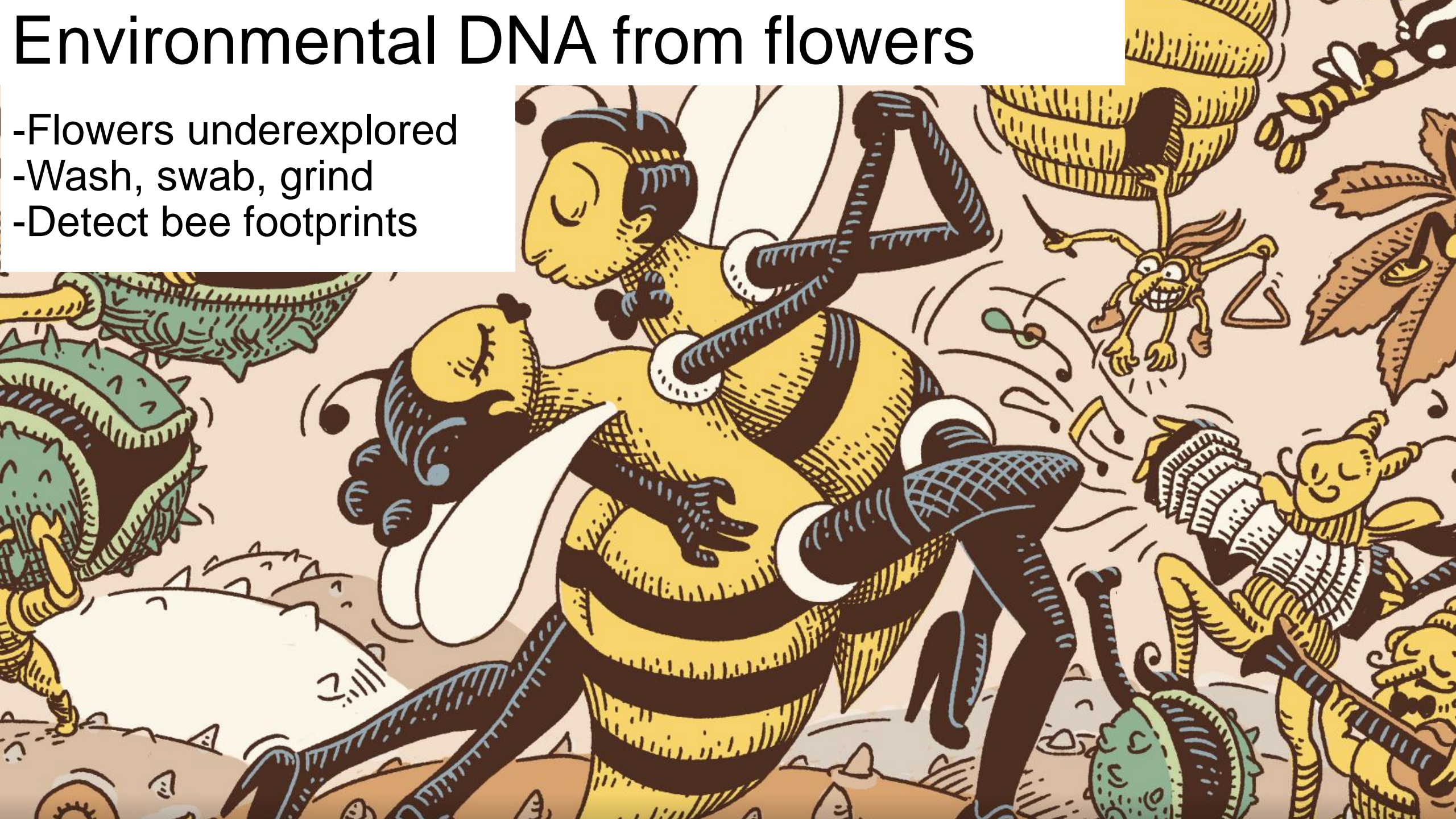


Monitoring



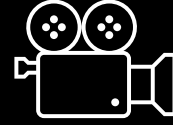
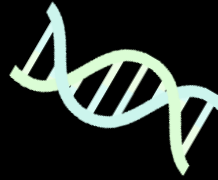
Environmental DNA from flowers

- Flowers underexplored
- Wash, swab, grind
- Detect bee footprints





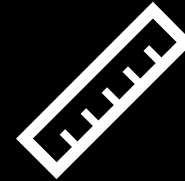
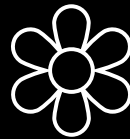
Q1.



One or the other or together?



Q2.



Are the same species doing the heavy lifting all the time and in all places?



Q3.



Bigger is better for detectability?



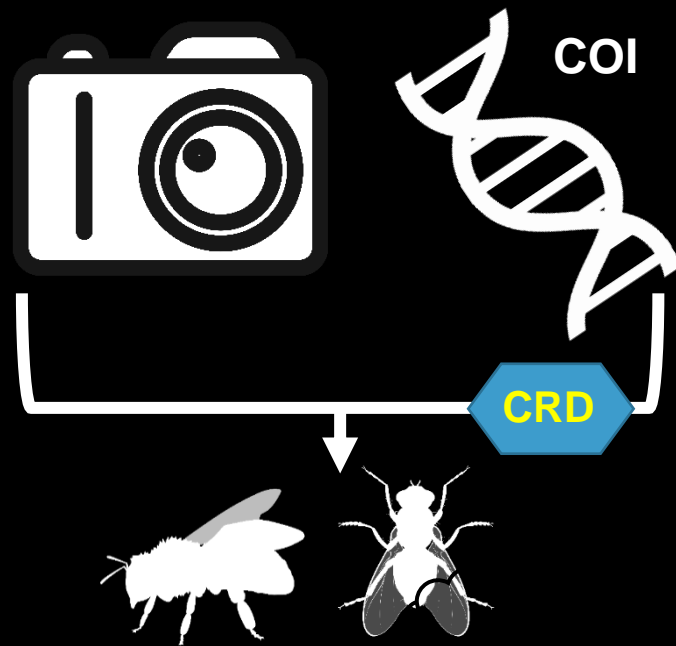
Study design



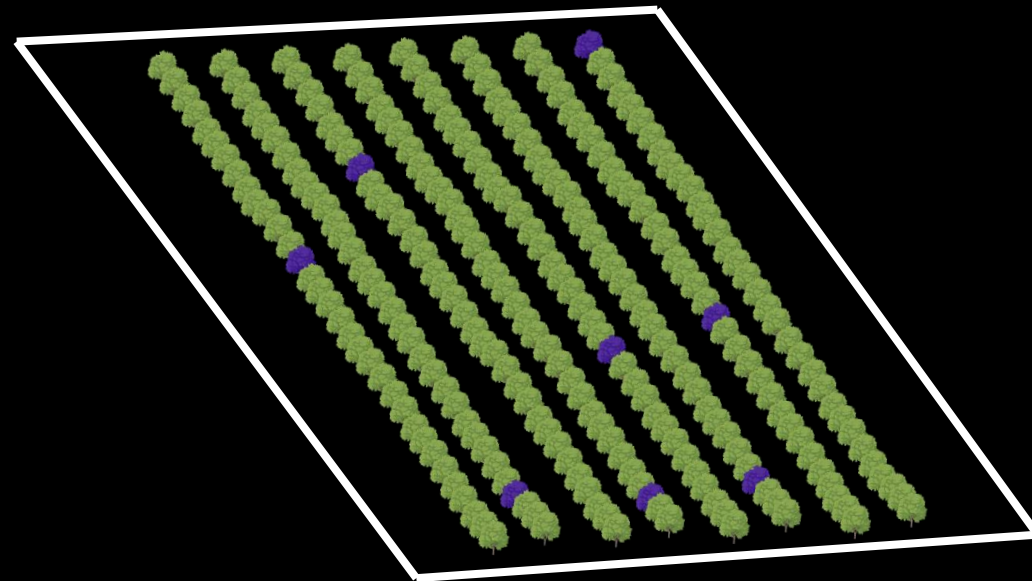
Low flowering



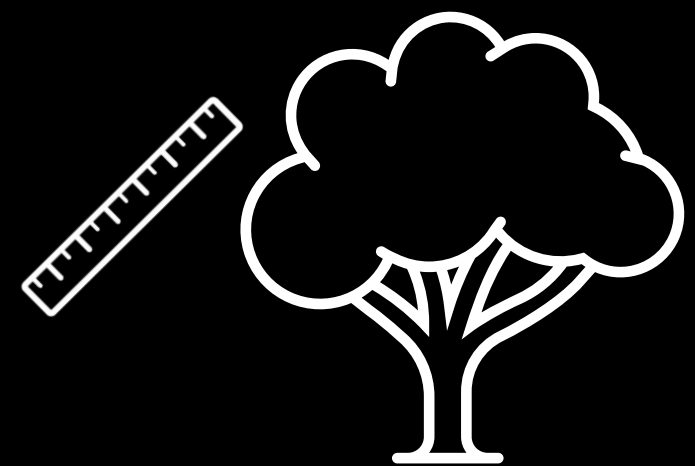
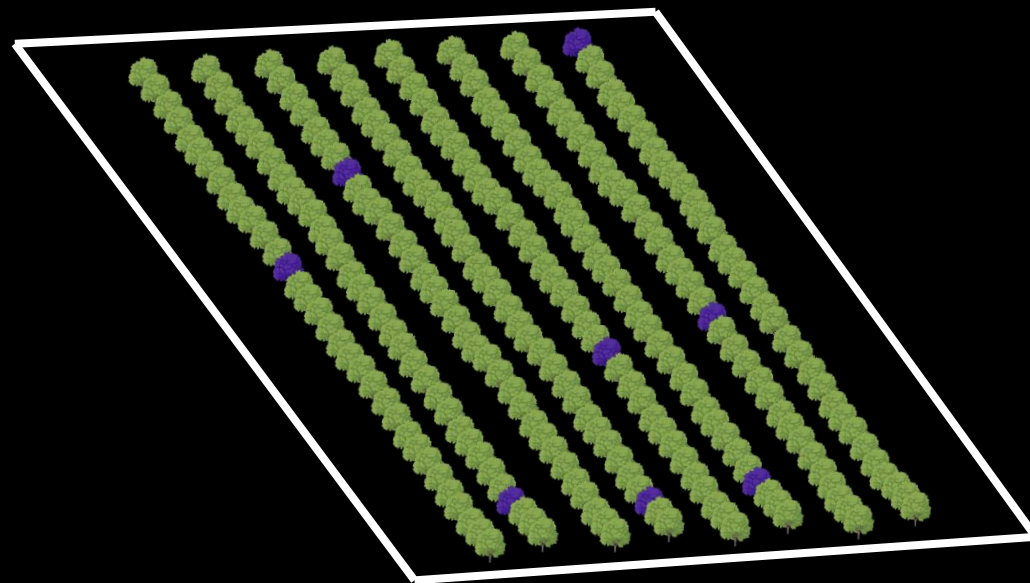
Peak flowering



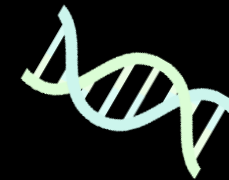
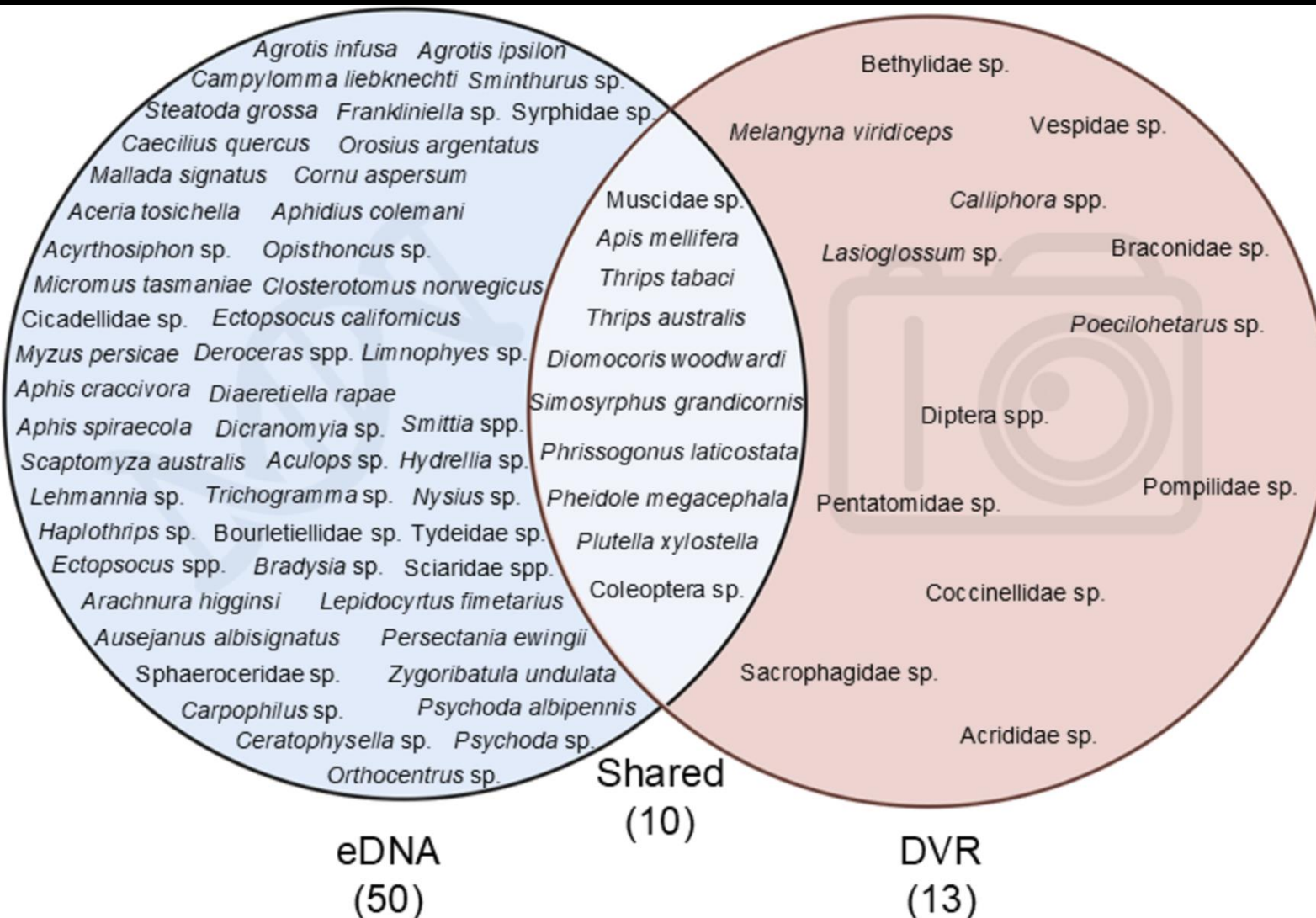
Orchard MB



Orchard BA

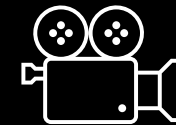


Comparison of the two methods





















Taxonomic resolution

Species richness



Abundance and frequency information

Picked up species missed by eDNA e.g. *Calliphora* spp

Method		Co-variates			
					
All 		*	***	N.S	-
		$p = 0.04$	$p < 0.001$		
Hymenoptera 		***	***	*	-
		$p < 0.001$	$p < 0.001$	$p = 0.03$	
Diptera 		***	***	N.S	-
		$p < 0.001$	$p = 0.001$		
Ancillary 		N.S	***	*	-
			$p = 0.001$	$p = 0.03$	
					
All 		***	***	-	***
		$p < 0.001$	$p < 0.001$		$p < 0.001$
Hymenoptera 		***	***	-	N.S
		$p < 0.001$	$p < 0.001$		
Diptera 		***	***	-	***
		$p < 0.001$	$p < 0.001$		$p < 0.001$
Ancillary 		***	N.S	-	N.S
		$p < 0.001$			

 Sample Orchard  Flowering period  Inflorescence height

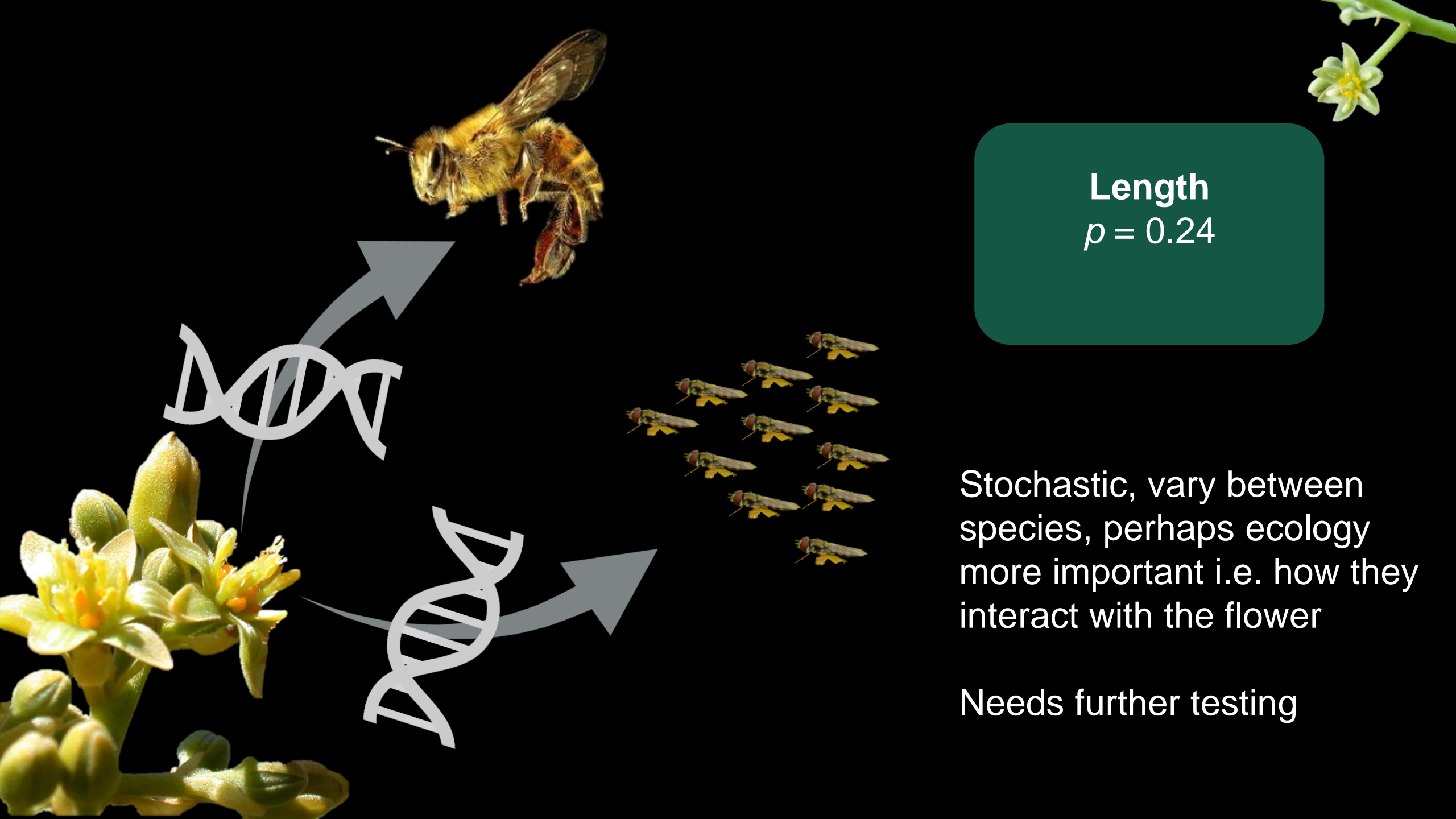
 DVR deployment time

Spatial and temporal variation

Different arthropod communities at different orchards--40% similarity at low flowering--driven by rare or site-specific species?

Arthropod communities became more similar at peak flowering--decrease in singletons--a sequencing depth issue?

Probability of detecting hymenoptera species was greater in the upper canopy--greater availability of flower resources?



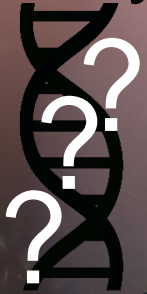
Length
 $p = 0.24$

Stochastic, vary between species, perhaps ecology more important i.e. how they interact with the flower

Needs further testing

Challenges

Assays



eDNA and
airborne
dispersal



Weather



Now what?

VISITORS

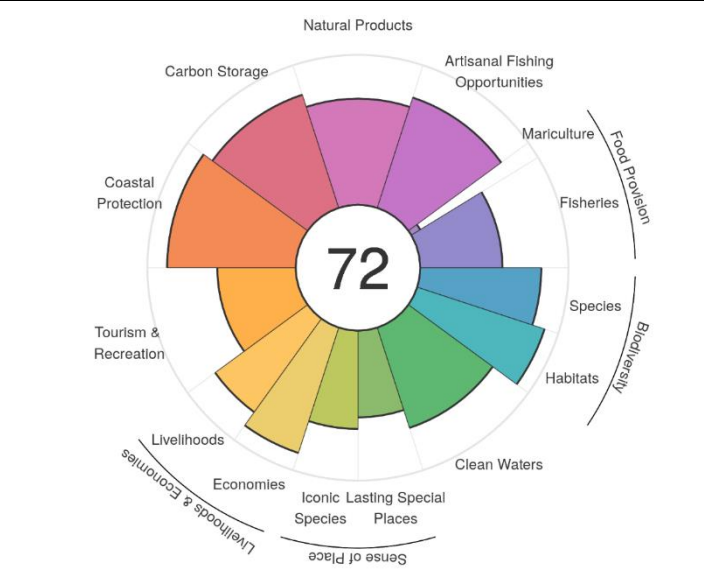
PLEASE RESPECT

FARM BIOSECURITY

Vehicles, people and equipment can carry weed seeds, pests & diseases. Stay on road and beware of livestock

BUILDING BACK BETTER:
NATURAL CAPITAL ACCOUNTING FOR A GREEN RECOVERY
15 DECEMBER 2020, 9:30-10:30 AM EST/2:30-3:30 PM

United Nations | Department of Economic and Social Affairs | System of Environmental Economic Accounting | UNIVERSITY OF CAMBRIDGE | Be for Ca





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Joshua H. Kestel ^{a,b,c,*}, Philip W. Bateman ^{a,b,c,d}, David L. Field ^e, Nicole E. White ^{a,c}, Ben L. Phillips ^c, Paul Nevill ^{a,b,c}

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Figures References Related Information

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