

IMPORTANCE OF PHYTOPHAGY: TAKE IT OR LEAF IT

MOSQUITO DIET, BEHAVIOR, AND EVOLUTION

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REVIEW OF JOURNAL ARTICLE BY DANIEL PEACH AND GERHARD GRIES

PICTURES COLLECTED THROUGH WEB SEARCHES



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MINI REVIEW

Mosquito phytophagy – sources exploited, ecological function, and evolutionary transition to haematophagy

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PHYTOPHAGY: THE EATING OF PLANTS



- MOSQUITO PHYTOPHAGY: EATING PLANT LIQUIDS LIKE NECTAR
 - LIQUIDS ARE RICH IN SUGARS
 - BUT NOT JUST SUGAR FEEDING
 - LOTS OF AMINO ACIDS, SALTS, VITAMINS, AND OTHER MICRO AND MACRO NUTRIENTS IN THESE FLUIDS



WAYS MOSQUITOES CONDUCT PHYTOPHAGY



- FLOWER NECTAR
 - MAJORITY OF FEEDING IS THIS
 - ALLOWS MOSQUITOES TO BE POLLINATORS
 - POLLEN CAN STICK TO THE BODY PARTS AND CARRIED TO THE NEXT FLOWER
- EXTRAFLORAL NECTAR
 - PLANT NECTARS PRODUCED TO ATTRACT INSECTS LIKE ANTS
 - PRODUCE SYMBIOTIC RELATIONSHIP
 - PROTECTION AND LESS HERBIVORY
 - MOSQUITOES TAKE ADVANTAGE

WAYS MOSQUITOES CONDUCT PHYTOPHAGY

- PLANT TISSUES
 - DAMAGED OR UNDAMAGED TISSUES
 - MOSQUITO PROBOSCIS CAN PENETRATE TISSUES TO GET TO THE LIQUIDS
- FRUIT AND SEEDPODS
 - FRUIT HAS BEEN USED IN LABORATORIES TO FEED AND MAINTAIN MOSQUITO COLONIES
 - FRUIT HAS BEEN USED AS BAIT IN ADULT MOSQUITO TRAPPING
 - CO₂ AND OTHER BAITS TEND TO COLLECT MORE



WAYS MOSQUITOES CONDUCT PHYTOPHAGY



- HONEYDEW: SUGAR-RICH AND STICKY LIQUID, SECRETED BY APHIDS AND OTHER INSECTS
- EASILY ACCESSIBLE FOOD SOURCE
 - ANTS, MOSQUITOES, OTHER INSECTS



M.J. Raupp



WAYS MOSQUITOES CONDUCT PHYTOPHAGY



- SOME ANTS WILL FARM APHIDS FOR THEIR HONEYDEW AND PROTECT THEIR LIVESTOCK
 - SYMBIOTIC RELATIONSHIP
- THESE ANTS CAN THEN FEED OTHERS IN THE COLONY BY REGURGITATING (VOMITING) IN THEIR MOUTHS
 - STIMULATING REGURGITATION BY VISUAL OR CHEMICAL SIGNALS AND STROKING THE ANTENNAE OF THE FOOD PRODUCER

WAYS MOSQUITOES CONDUCT PHYTOPHAGY

- MOSQUITO SPECIES IN THE GENUS MALAYA HAVE BEEN DOCUMENTED FEEDING THIS WAY AS WELL
 - KLEPTOPARASITISM
 - MOSQUITO APPROACHES THE ANT AND STOKES ITS ANTENNAE
 - MEAL IS PRODUCED BY THE ANT AND EATEN BY THE MOSQUITO

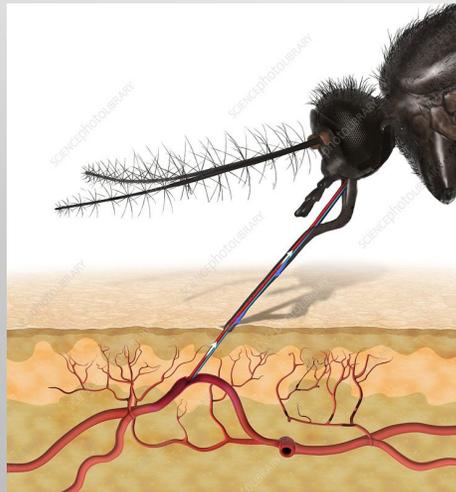


PHYTOPHAGY EVOLVING TO HEMATOPHAGY

- HEMATOPHAGY IS THE FEEDING ON THE BLOOD OF VERTEBRATES



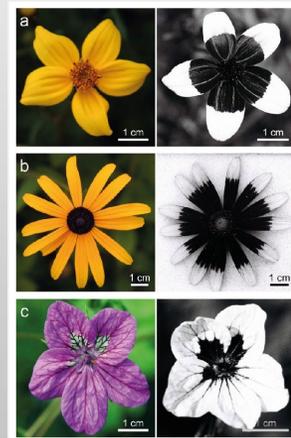
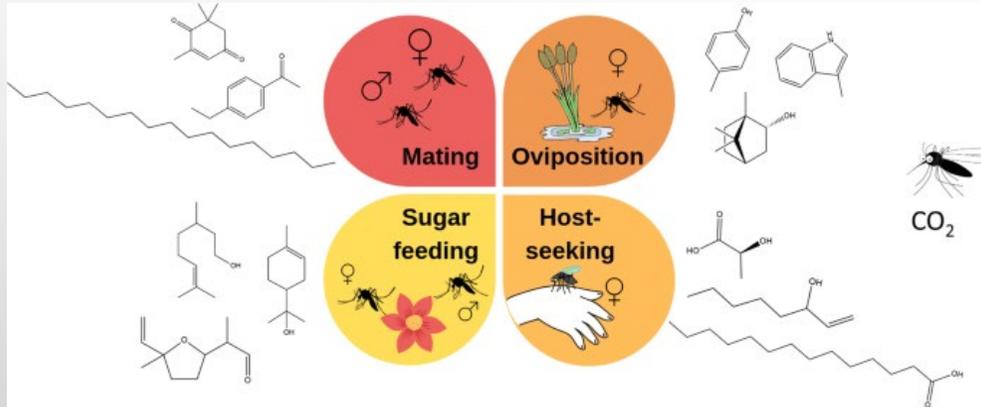
PHYTOPHAGY EVOLVING TO HEMATOPHAGY



- MOSQUITOES MAYBE MORE GENERALISTS IN THEIR FOOD FORAGING. SEARCHING FOR THE BEST MEALS THAT GIVE OFF CERTAIN CUES
- ARE THESE CUES SHARED BY BOTH PLANTS AND ANIMALS?
- DID MOSQUITOES FIRST CONDUCT HEMATOPHAGY BY “ACCIDENTLY” FEEDING ON ANIMALS THINKING THEY WERE A PLANTS?

PHYTOPHAGY EVOLVING TO HEMATOPHAGY

CUES SHARED BY BOTH PLANTS AND ANIMALS



- **CHEMICAL CUES FROM PLANTS**

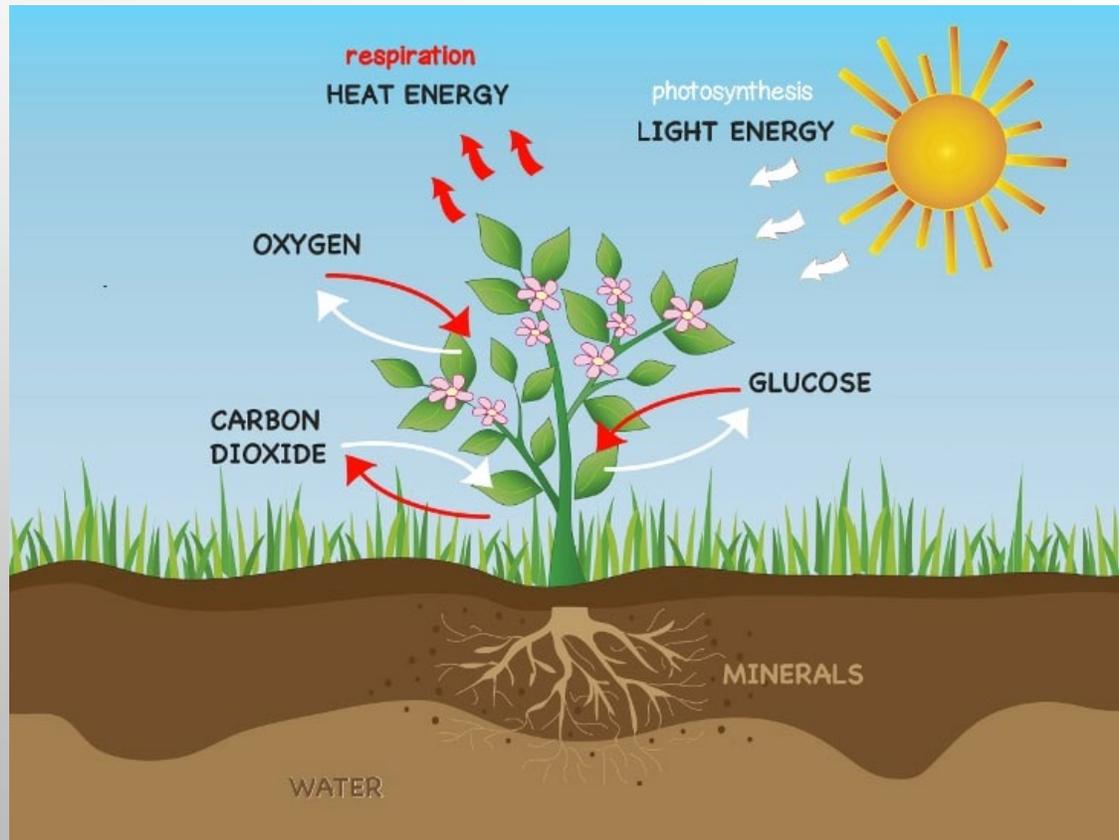
- FATTY ACIDS, PHENOLS, KETONES, ALCOHOLS, AND MANY OTHERS
- SOME OF THESE SAME CUES ARE GIVEN OFF BY ANIMAL SKIN

- **DARK COLORS (VISUAL CUE)**

- EVEN THOUGH FLOWERS ARE VIEWED AS BRIGHT COLORS TO US, THEY MAYBE ABSORBING UV LIGHT IN DIFFERENT PATTERNS AND LOOK DARK TO POLLINATING INSECTS

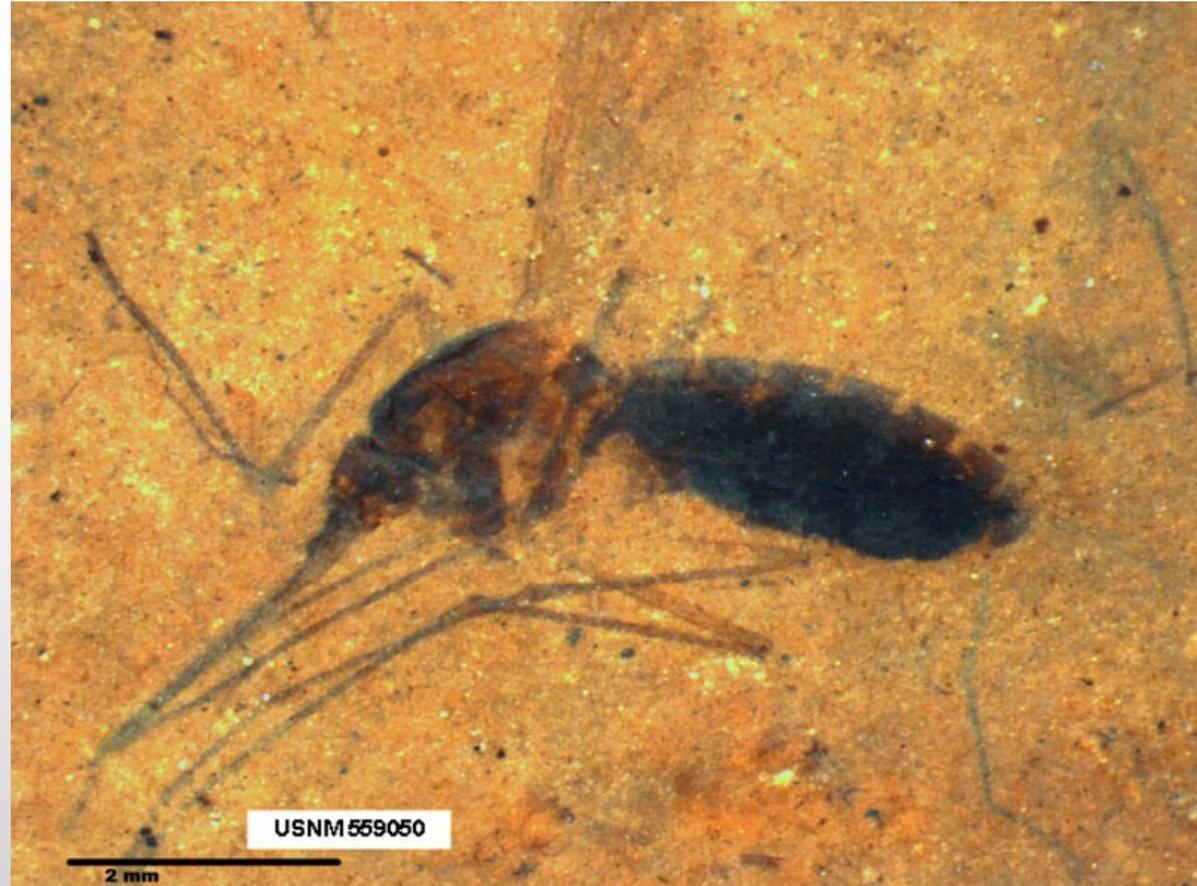
PHYTOPHAGY EVOLVING TO HEMATOPHAGY

CUES SHARED BY BOTH PLANTS AND ANIMALS



- CARBON DIOXIDE
 - AFTER SUNSET, PLANTS STOP PHOTOSYNTHESIS AND START TO RELEASE MORE NET CO₂
 - MICROBES ON CERTAIN PLANT PARTS CAN GIVE OFF CO₂ AND OTHER CHEMICAL CUES
- HEAT
 - PLANTS GIVE OFF HEAT FROM RESPIRATION
 - FLOWERS CAN ABSORB UV LIGHT AND MAY BE WARMER THEN OTHER PARTS OF THE PLANT

46 million-year-old fossilized mosquito
First fossil to show hematophagy



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