

Kiel University, Germany

Functional Morphology and Biomechanics

Effect of Nanoporous Substrates on Fluid-Mediated Attachment of Insects

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Insect Terrain

Insect Attachment to Nanoporous Surfaces

Contact Problem

GORB and GORB, 2009

Insect Attachment to Nanoporous Surfaces

Plant Surfaces

GORB and GORB, 2002

Insect Attachment to Nanoporous Surfaces

Insect Attachment on Plant Surfaces

GORB and GORB, 2002

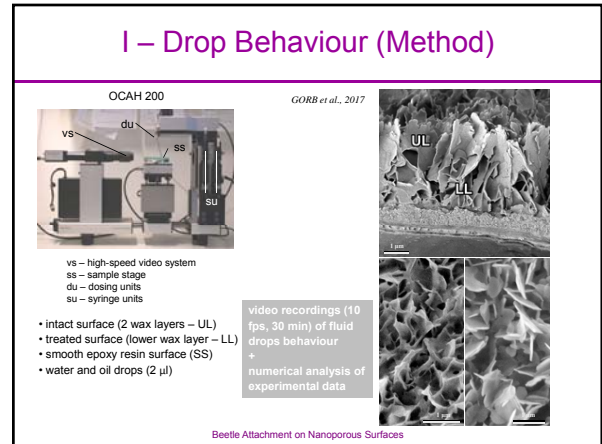
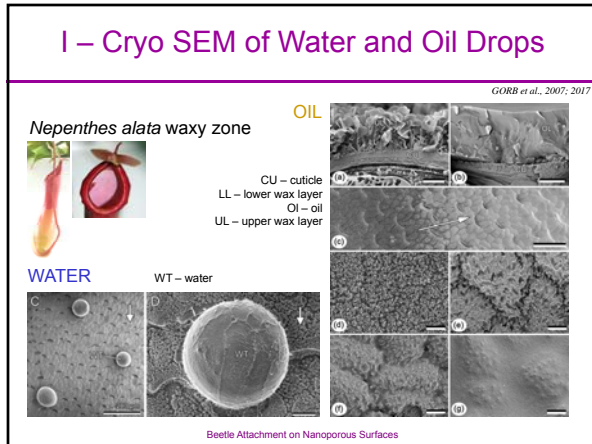
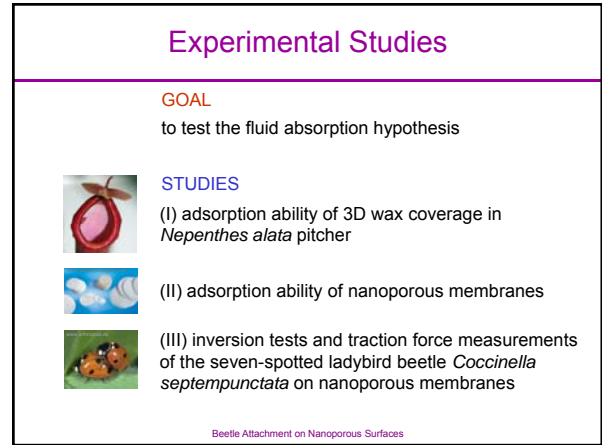
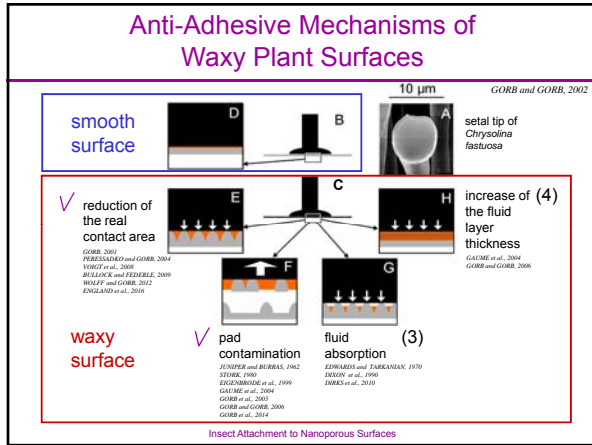
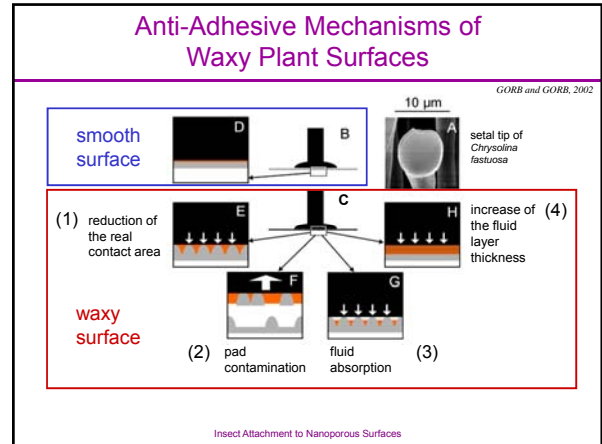
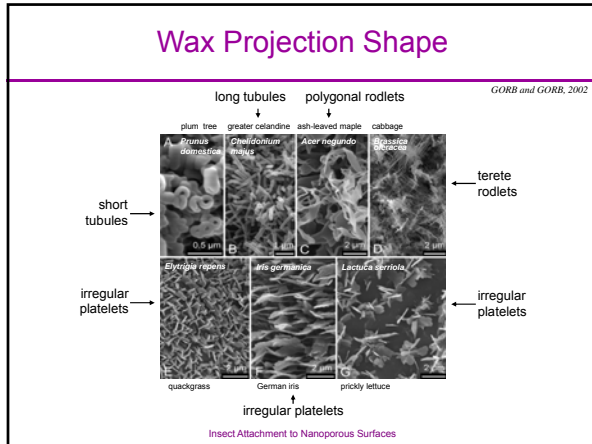
tests with 99 plant surfaces and the beetle *Chrysolina fastuosa*

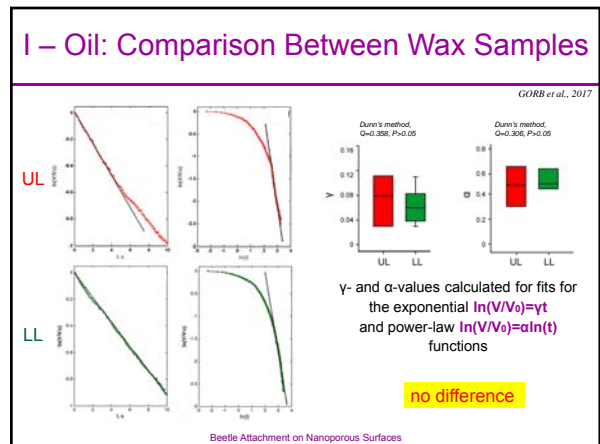
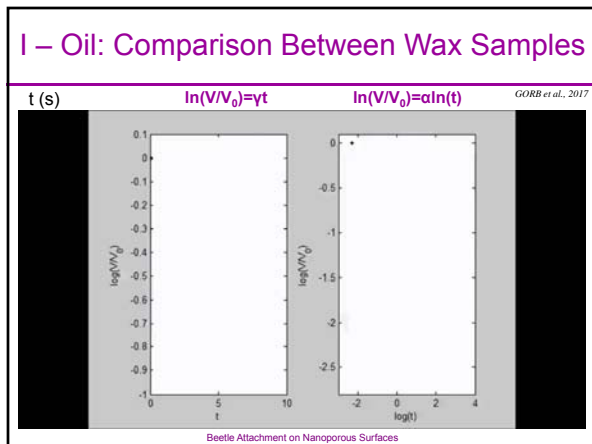
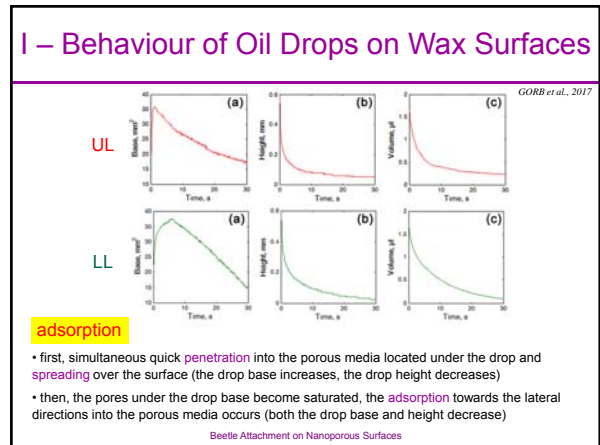
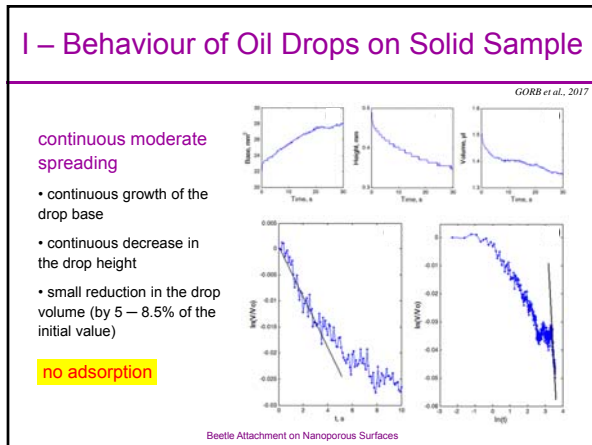
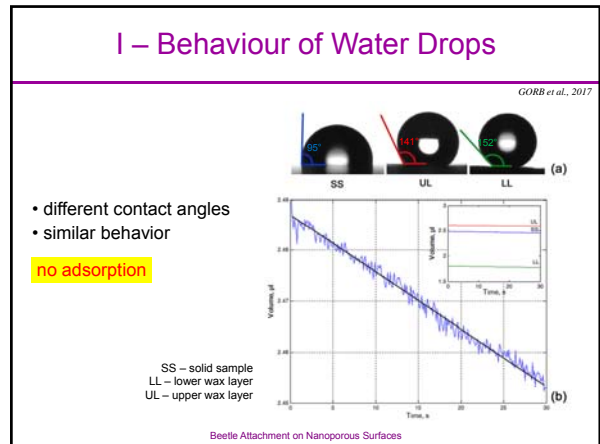
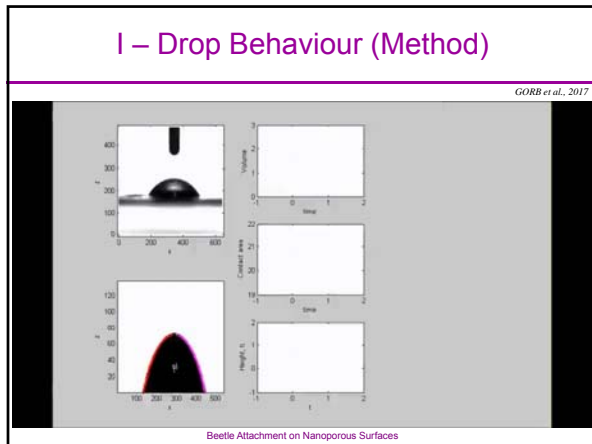
Insect Attachment to Nanoporous Surfaces

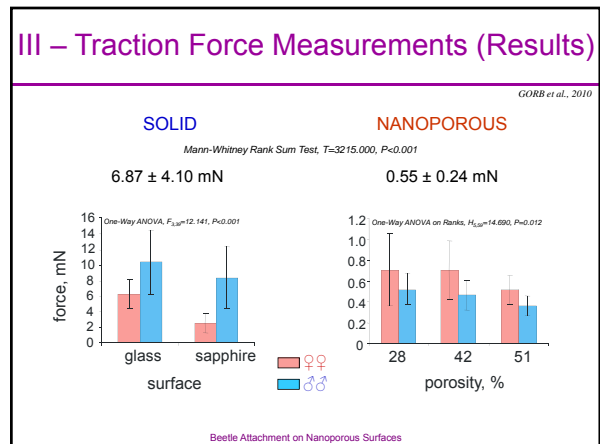
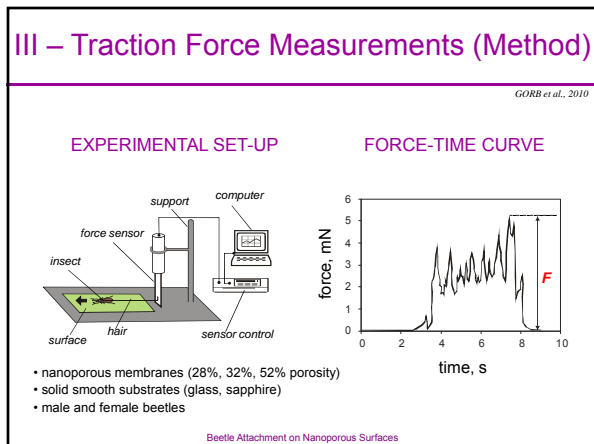
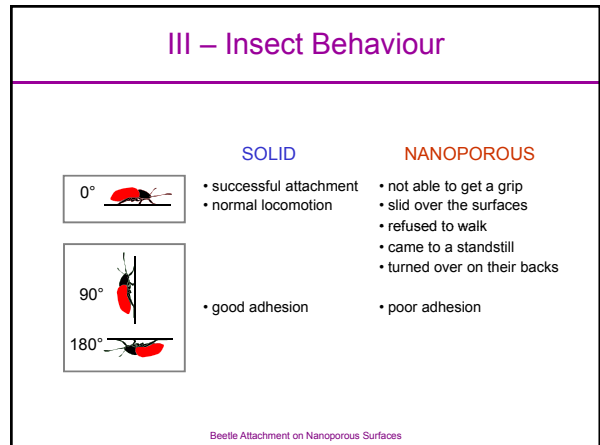
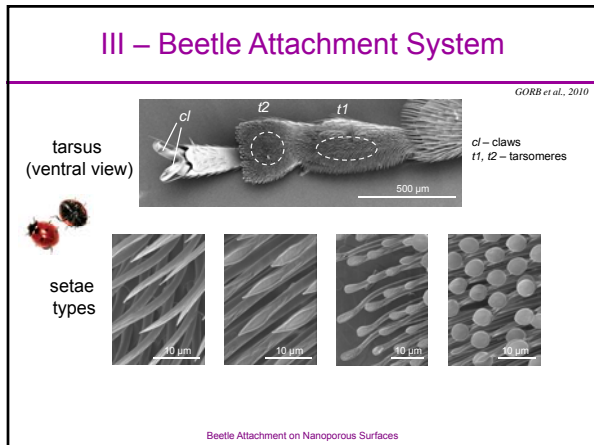
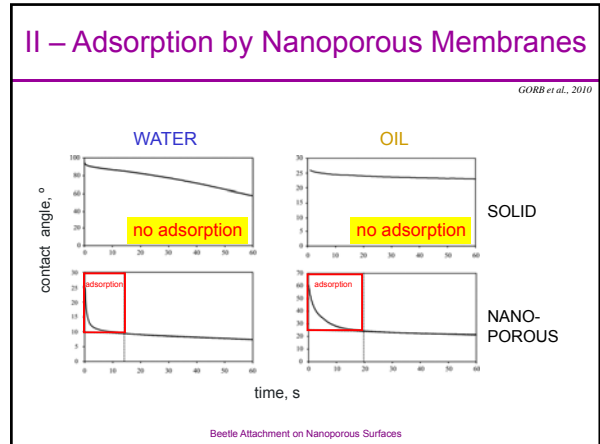
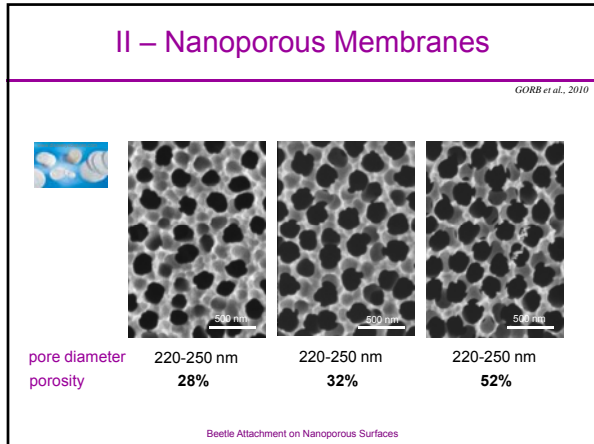
Wax-Bearing Plant Surfaces

Brassica oleracea cabbage (leaf, upper)
Chenopodium album white goosefoot (leaf, upper)
Lactuca serriola prickly lettuce (leaf, upper)
Robinia pseudoacacia black locust (leaf, upper)
Chelidonium majus greater celandine (leaf, lower)
Acer negundo ash-leaved maple (stem)
Prunus domestica plum tree (fruit)
Nepenthes alata tropical pitcher plant (pitcher, inside)

Insect Attachment to Nanoporous Surfaces







Conclusions



(1) Attachment abilities of insects depend on the substrate texture.



(2) 3D wax coverages in plants are able to adsorb fluids.



(3) Beetles attached poorly and generated lower traction forces on microrough nanoporous membranes compared to smooth solid surfaces.



(4) The reduction of insect attachment and traction forces on membranous substrates may be explained by the absorption of insect adhesive fluid and/or by effect of the surface roughness.

Beetle Attachment on Nanoporous Surfaces