HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH – UFZ

LEGATO RICE ECOYSTEM SERVICES

L.U.P.O.

Dragonflies in rice paddies – diversity, ES and conservation measurements

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SUSTAINABLE LAND MANAGEMENT

FONA Research for Sustainable Development BMBF

Dragonflies in LEGATO

- Philippines: > 300 species and many new ones
  - in particular on islands and in remote mountainous areas
- Vietnam: about 235 species (Do & Dang 2006)
  - in 2014 already > 280 (Do pers. comm. 2014)
  - actually > 300 (Do pers. comm. 2016)
  - also new species near urban areas and even near cities like Hanoi
- many undescribed, some (or many ?) still undiscovered
- literature available, but still many gaps to fill
- need for a national database

Dragonflies in LEGATO

- complex ecology
  - larvae aquatic
  - adults terrestrial
- complex behaviour
- good indicators for:
  - biotopes / biotope quality / biotope complexity
  - impacts
  - climatic and global changes

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

„actors“ involved:

- leafhoppers und planthoppers
- damselflies
- dragonflies

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

damselflies and dragonflies are very important and effective predators in the rice / paddy fields

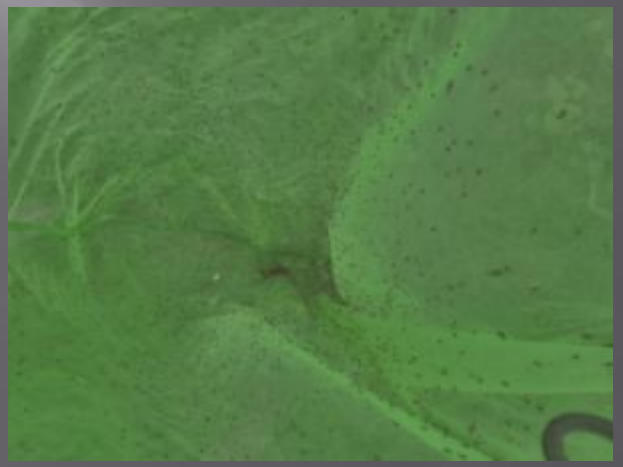
↓

very beneficial !

Dragonflies in LEGATO

„dragonfly food web“: who much do they eat ?

Ischnura senegalensis



thanks to Dong & Leo (PhilRice)

Dragonflies in LEGATO

„dragonfly food web“: who much do they eat ?

Ischnura senegalensis

Dragonflies in LEGATO

„dragonfly food web“: who much do they eat ?

Ischnura senegalensis

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

GLH /BPH

7 – 12 minutes

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

GLH /BPH

3 – 5 minutes

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

BPH < 0,5 minute - damselfly / dragonfly 3 / 5 minutes

Dragonflies in LEGATO

„dragonfly food web“: who feeds on what ?

<u>results:</u>

- BPH and GLH are preyed by all damsel- and dragonflies
- damselflies prey also on sitting BPH + GLH, dragonflies only on flying insects
- small damselflies are preyed by bigger damselflies
- all damselflies are preyed by all dragonflies
- smaller dragonflies are preyed by bigger dragonflies

-> damselflies and dragonflies are very important and effective predators in rice fields – very beneficial !

Dragonflies in LEGATO

- rice fields as biotopes for dragonflies:
  - special coenosis
  - mostly euryoecious species
  - mostly dragonflies and here libellulids (exophytic)
  - adapted on the “rice cycle”

  - different stages of the paddies
    - early after planting: open waters, young paddies
    - later: dense rice plants, mature paddies
    - abondant paddies: more natural

Dragonflies in LEGATO

- neighboring biotopes for dragonflies:

- biotopes within the paddy-system
  - ditches and channels
  - brooks / rivers
  - ponds
- biotopes in the surrounding area
  - ponds / lakes
  - marshes
  - brooks / rivers

  → more natural and in / near forests

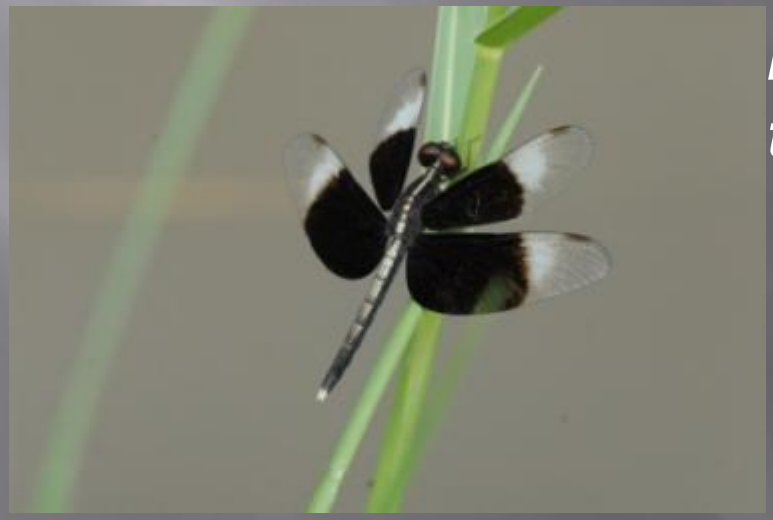
rice dragons

- damselflies

Agriocnemis femina

rice dragons

Orthetrum sabina



Neurothemis tullia

Brachythemis contaminata

rice dragons

- dragonflies

Neurothemis fulvia

Orthetrum pruinosum + O. testaceum

rice dragons

- dragonflies

Pantala flacescens

Crocothemis servilia

Diplacodes trivialis

dragons in old paddies and ponds

Nannophya pygmaea

Palpopleura sexmaculata

Diplacodes nebulosa

dragons in open waters and channels

Tholymis tillarga

Pseudagrion rubriceps

Brachythemis contaminata

dragons in open waters and channels

Sinictinogomphus clavatus

Ictinogomphus decoratus

Trithemis annulata

dragons in ponds and lakes

Copera marginipes

Rhyothemis phyllis

Rhodothemis rufa

dragons in natural brooks

Euphaea guerini

Heliocypha perforata

Mnais mneme

Neurobasis chinensis

dragons in natural brooks

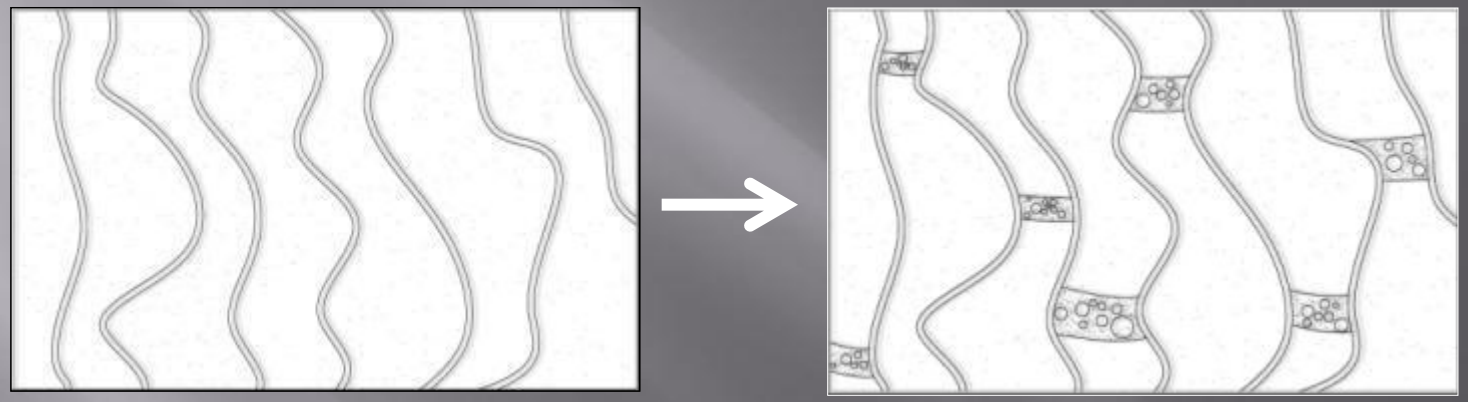
important sources for recolonisation of paddy fields

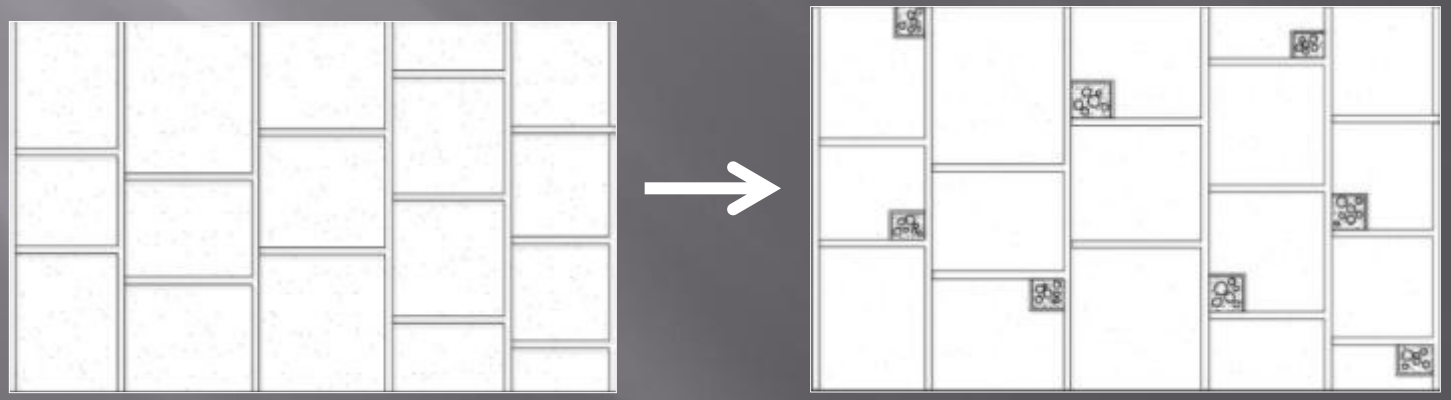
dragons in natural brooks

important sources for recolonisation of paddy fields

Conservation management for dragons

Management for dragonflies: habitat enrichment





Conservation management for dragons

Management for dragonflies: habitat enrichment

ponds at PhilRice in 2013

Conservation management for dragons

Management for dragonflies: habitat enrichment

ponds at PhilRice in 2016

Dragonflies in LEGATO

- damselflies and dragonflies play a prominent role as predators in the paddy fields (larvae/adults)
- they are good indicators for the habitat diversity (species and coenosis/composition)
- easy management measurements through ecological engeneering can improve their diversity and abundance (effectiveness)
- they are beneficial, as they are relevant for pest control and also economically of interest

Dragonflies in LEGATO

- paddy field coenosis / communities are typical
  lowland – mountainous
  stage: young --- > mature

- to some extent overlapping – potential for recolonisation
- coenosis of channels and brooks are different

- in total > 70 species (some more to be determined)
- mainly libellulids – few damselflies
- one species in all biotopes: *Orthetrum pruinosum*

Aristocypha fenestrella