BIG4 field workshop

June 5-11 2016, Havraníky, Czech Republic

BIG4 insect groups
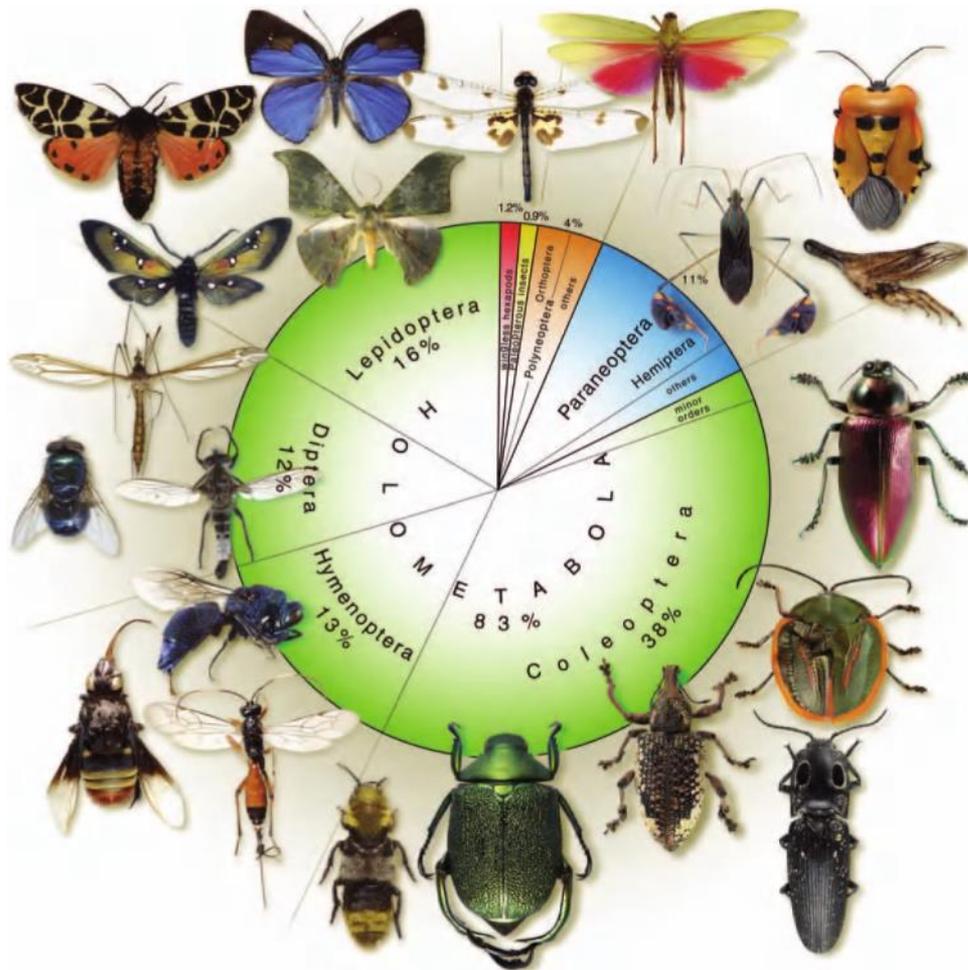

TABLE 1.1. Numbers of Described Species of Extant Hexapods

Wingless Orders:	Species
Entognatha:	
Protura	600
Collembola	9,000
Diplura	1,000
Archaeognatha	500
Zygentoma	400
Paleopterous Orders:	
Ephemeroptera	3,100
Odonata	5,500
Polyneopterous Orders:	
Grylloblattodea + Mantophasmatodea	41
Phasmatodea	3,000
Orthoptera	20,000
Dermaptera	2,000
Embiodea	500
Plecoptera	2,000
Zoraptera	32
Dictyoptera:	
Blattodea	4,000
Mantodea	1,800
Isoptera	2,900
Paraneoptera:	
Psocoptera	4,400
Phthiraptera	4,900
Thysanoptera	5,000
Hemiptera	90,000
Holometabola:	
Neuropterida	6,500
Coleoptera	350,000
Strepsiptera	550
Mecoptera	600
Siphonaptera	2,500
Diptera	120,000
Hymenoptera	125,000
Trichoptera	11,000
Lepidoptera	150,000
Approximate Total	**926,400**

"Big four":
- Coleoptera (beetles)
- Lepidoptera
- Hymenoptera
- Diptera

BIG 4
Biosystematics, Informatics, Genomics

BIG4 insect groups
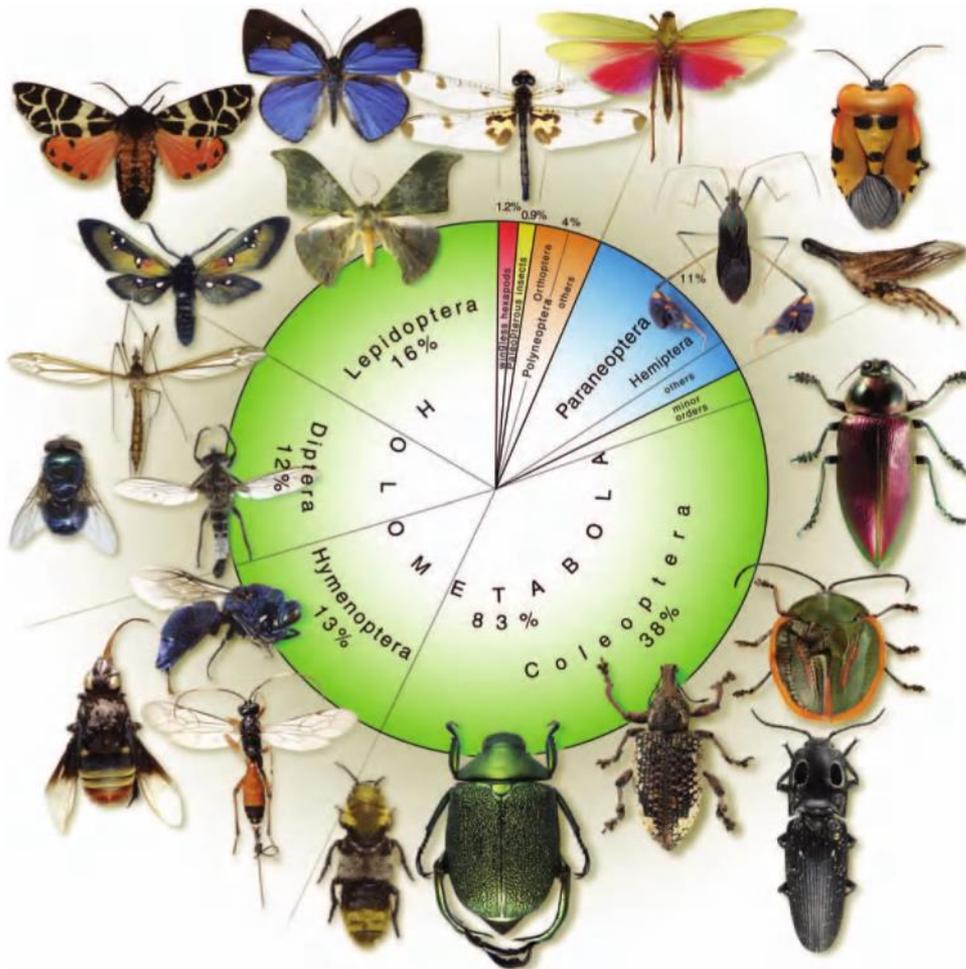
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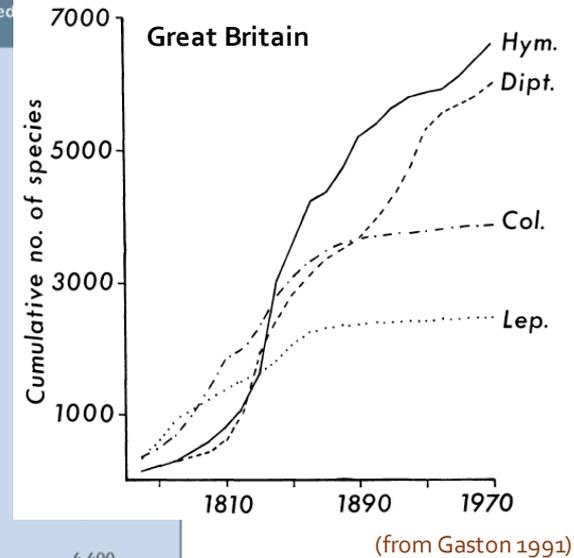
(from Gaston 1991)

"Big four":
- Coleoptera (beetles)
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The goal of the workshop

GOAL:
Species inventory of an area around the Havraníky village
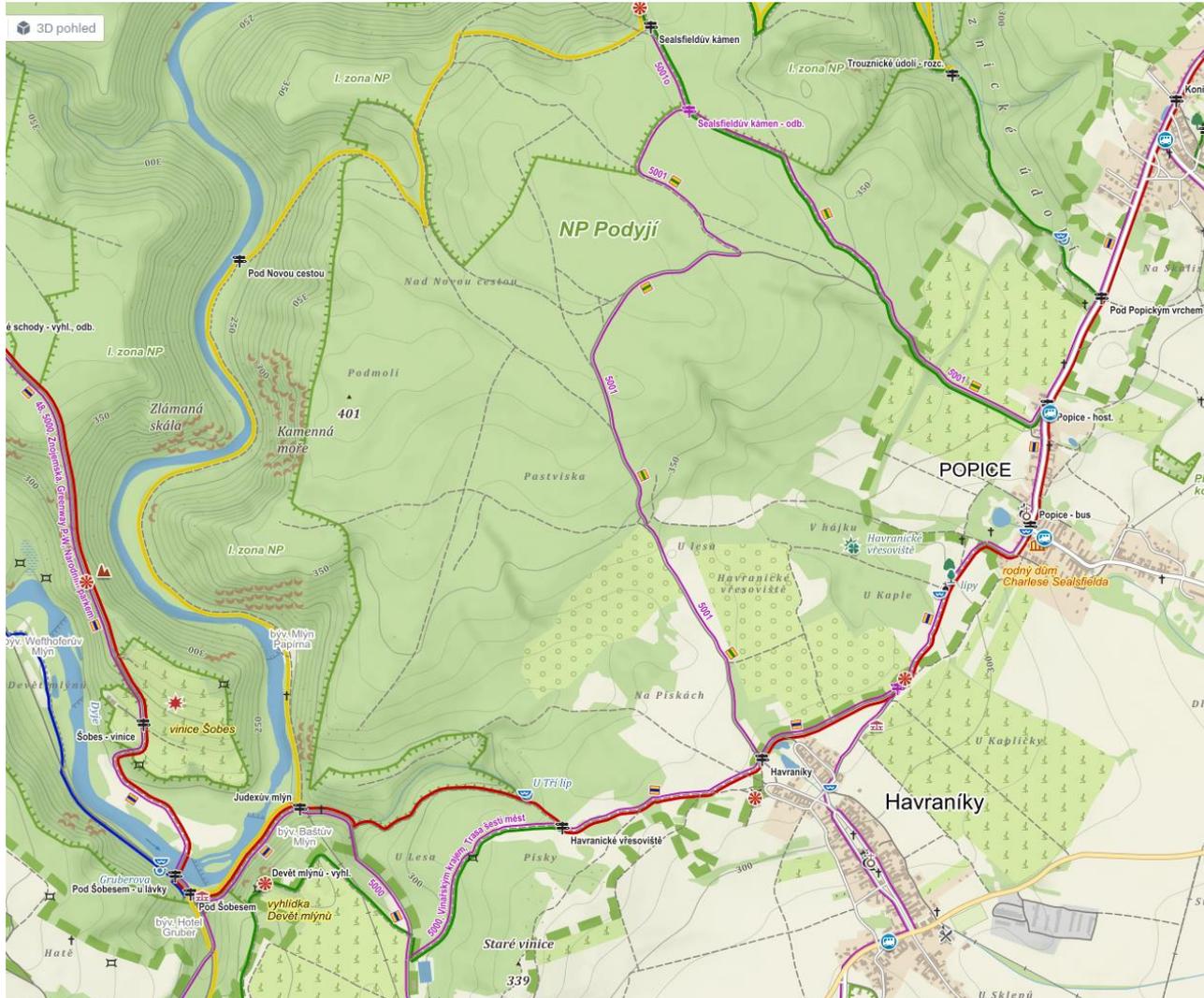
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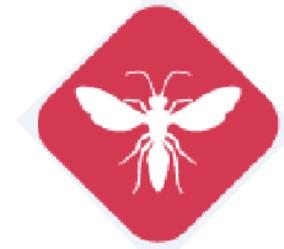
	Coleoptera	Lepidoptera	Hymenoptera	Diptera
Morphospecies				
Of that identified to genus or species				

Results
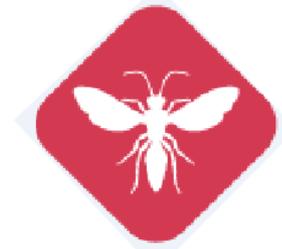
	Coleoptera	Lepidoptera	Hymenoptera	Diptera
Morphospecies	196	331	235	48 families
Of that identified to genus or species	136	331	52	24

Problems we faced

- Time consuming + needs previous knowledge/expertise

- Keys too complex:
  - Complex terminology
  - Sometimes they ask about characters I cannot see in my specimen
  - Too many characters have to be considered at one moment

- Absence of pictures (habitus + details of diagnostic characters) – except in Lepidoptera: only pictures, no keys

- Keys written in local languages (German, Czech)

Usual way of study...

1. Field work – collecting of specimens/material **Field worker**
2. Raw presorting of collected materual (e.g. into orders or families).

3. Sorting of samples into groups of morphologically similar specimens ("morfospecies").

4. Identification of each species based on literature (e.g. Identification keys ...) and the comparison with identified specimens in museums.

5. If there is no literature or identification is not reliable: comparison with original description and the type specimens

6. If new species are discovered: description/naming of new species. **Taxonomist**

What about a quicklier approach...?

1. Field work – collecting of specimens/material   **Parataxonomist**
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Sample 007/2010	Sample 007/2010	Sample 007/2010
Helophorus aquaticus	Helophoridae sp. 1	sp. 1
Helophorus nubilus	Helophoridae sp. 2	sp. 2
Hydrochus carinatus	Hydrochidae sp. 1	sp. 3
Spercheus emarginatus	Spercheidae sp. 1	sp. 4
Laccobius atratus	Hydrophilidae sp. 1	sp. 5
Laccobius minutus	Hydrophilidae sp. 2	sp. 6
Laccobius striatulus	Hydrophilidae sp. 3	sp. 7
Enochrus bicolor	Hydrophilidae sp. 4	sp. 8
Enochrus coarctatus	Hydrophilidae sp. 5	sp. 9
Hydrochara flavipes	Hydrophilidae sp. 6	sp. 10
Hydrophilus piceus	Hydrophilidae sp. 7	sp. 11
Coelostoma orbiculare	Hydrophilidae sp. 8	sp. 12

Pros and cons of parataxonomy

PROS

- **speeds up treatment of samples** – not slowed down by needs to compare with historical material
- **allows to involve local people**
- **facilitates to get the information on biology** – we can recognize the "species" and immediatelly study its biology
- **in some cases provides good data for ecological studies** - if sorting is done by skilled parataxonomists following well-done keys and identification guides
- **it is the only possibly method for some studies** – e.g. raw comparison of diversity between different habitats/biomes

CONS

- **its not possible to verify the identification** – no reference to type specimen
- **voucher specimens are frequently not kept** - impossible to verify even by re-sorting
- **number of species with a big bias (up to 100%)** – similar and closely related species not recognized
- **provised rather unreliable data for most biodiversity studies, cannot be used for:**
  - inventories (we cannot say which species we have in the samples)
  - biogeographic studies (same species is called differently in studies from different places/areas)
  - autecology (we dont know whether we study one species, two species of half of the species)
  - nature protection (number of species is not enough, we need to know about important/endangered species in the protected area)
  - phylogenetics (makes no sense to study how related are unknown species)