Ecological Indicator Values of Europe (EIVE) 1.0: a powerful open-access tool for vegetation scientists (oral presentation)

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European Vegetation Survey

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Ecological Indicator Values of Europe (EIVE) 1.0: a powerful open-access tool for vegetation scientists

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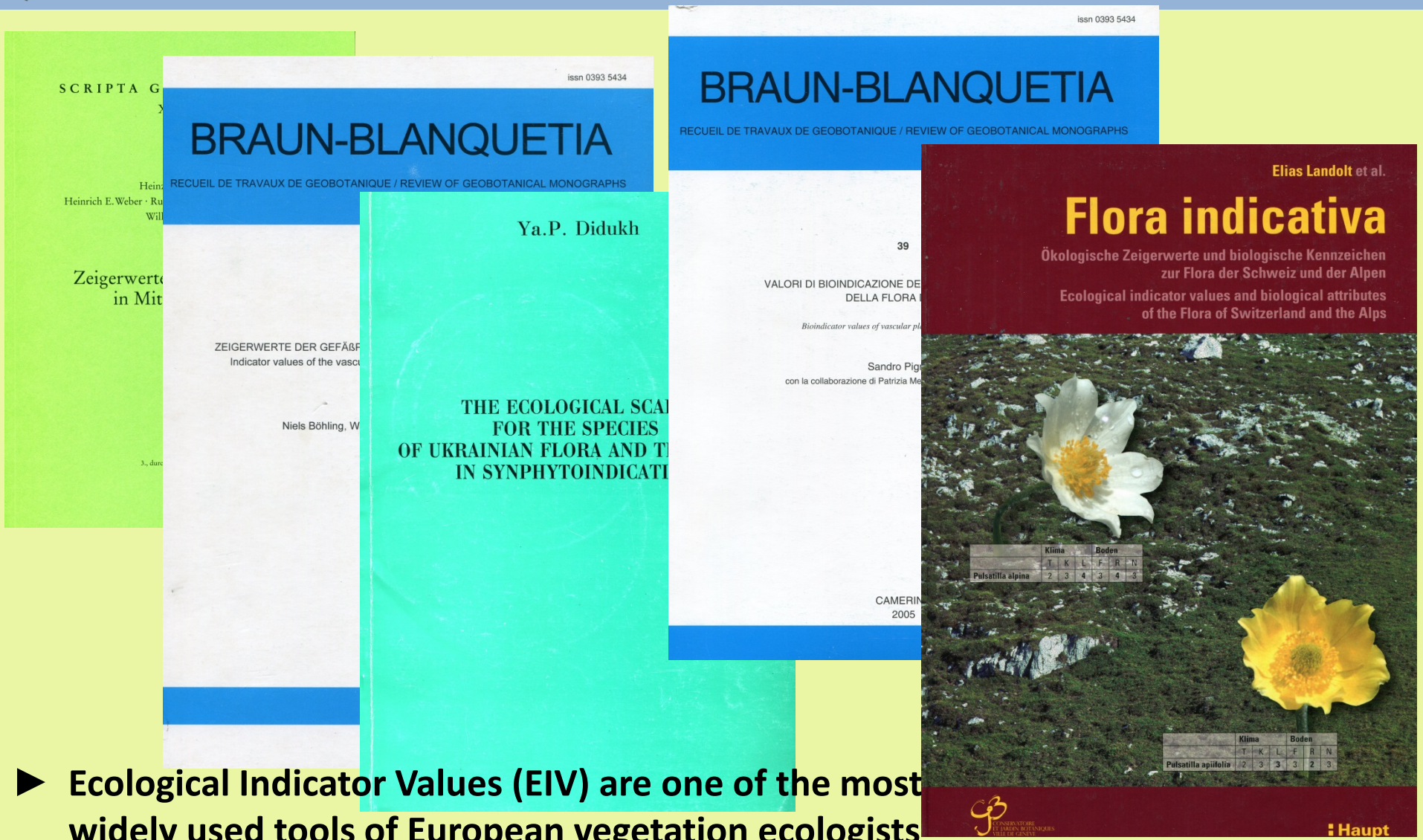
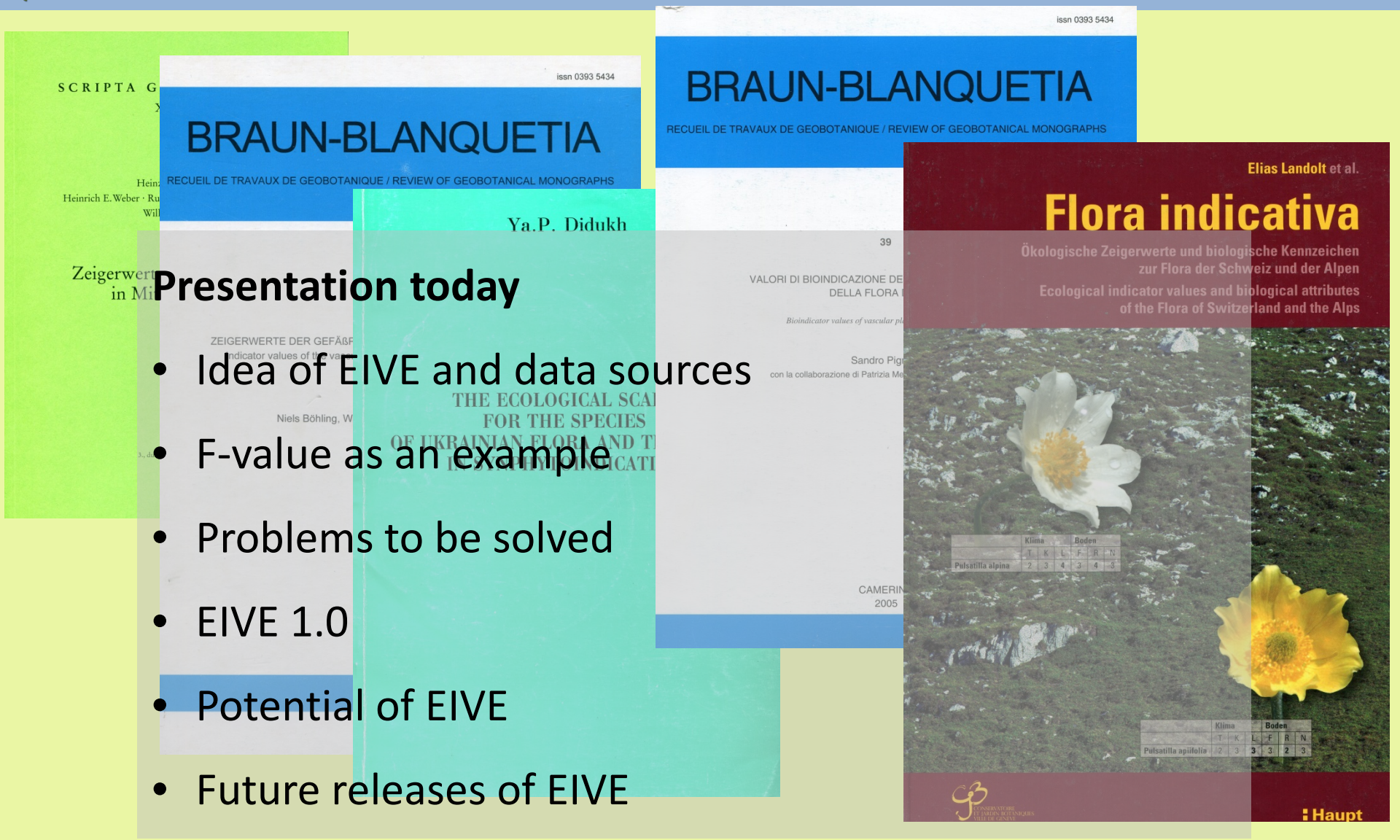


- **Ecological Indicator Values (EIV) are one of the most widely used tools of European vegetation ecologists**
- **Starting with Ramenskyi and Ellenberg, numerous national lists, but none that is applicable at European scale**



Presentation today

- Idea of EIVE and data sources
- F-value as an example
- Problems to be solved
- EIVE 1.0
- Potential of EIVE
- Future releases of EIVE

Idea of EIVE and data sources

- **A single indicator value system for all European (vascular) plants with uniform scales**

- **EIVE Database now comprises 29 individual EIV systems**
  (+ 2 more in preparation to be provided soon)
  - Some for whole countries, others for smaller regions
  - Some for all (vascular) plants, others only for forests or grasslands
  - Some with the „traditional“ Ellenberg parameters (F = moisture, R = reaction, N = nitrogen, T = temperature, K = continentality, L = light), others with various other/additional parameters

- **Approx. 22,000 taxon names and 25 parameters**

- **Main problems for establishment of a European system**
  - Plant taxonomy/nomenclature (synonyms, different concepts,…)
  - Scales vary widely among the EIV systems

The F-value (moisture) as an example

- **26 EIV systems contain F-values or something equivalent**

- **Scales:**
  1-5 (5x), 1-6 (3x), 1-7 (1x), 1-9 (2x), 1-12 (10x), 1-23 (2x), 1-120 (1x)
  0-11 (1x), 0-12 (1x)

- **Variance information:**
  none (9x)
  2 levels (7x)
  3 levels (4x)
  range (6x)

- **F11 = F12?**
  F11 and F12 (or F6 and F7) in many lists refer to the same ecological conditions, just to different growth forms

The F-value (moisture): steps of data processing

1. **Combine two highest levels if they mean the same**

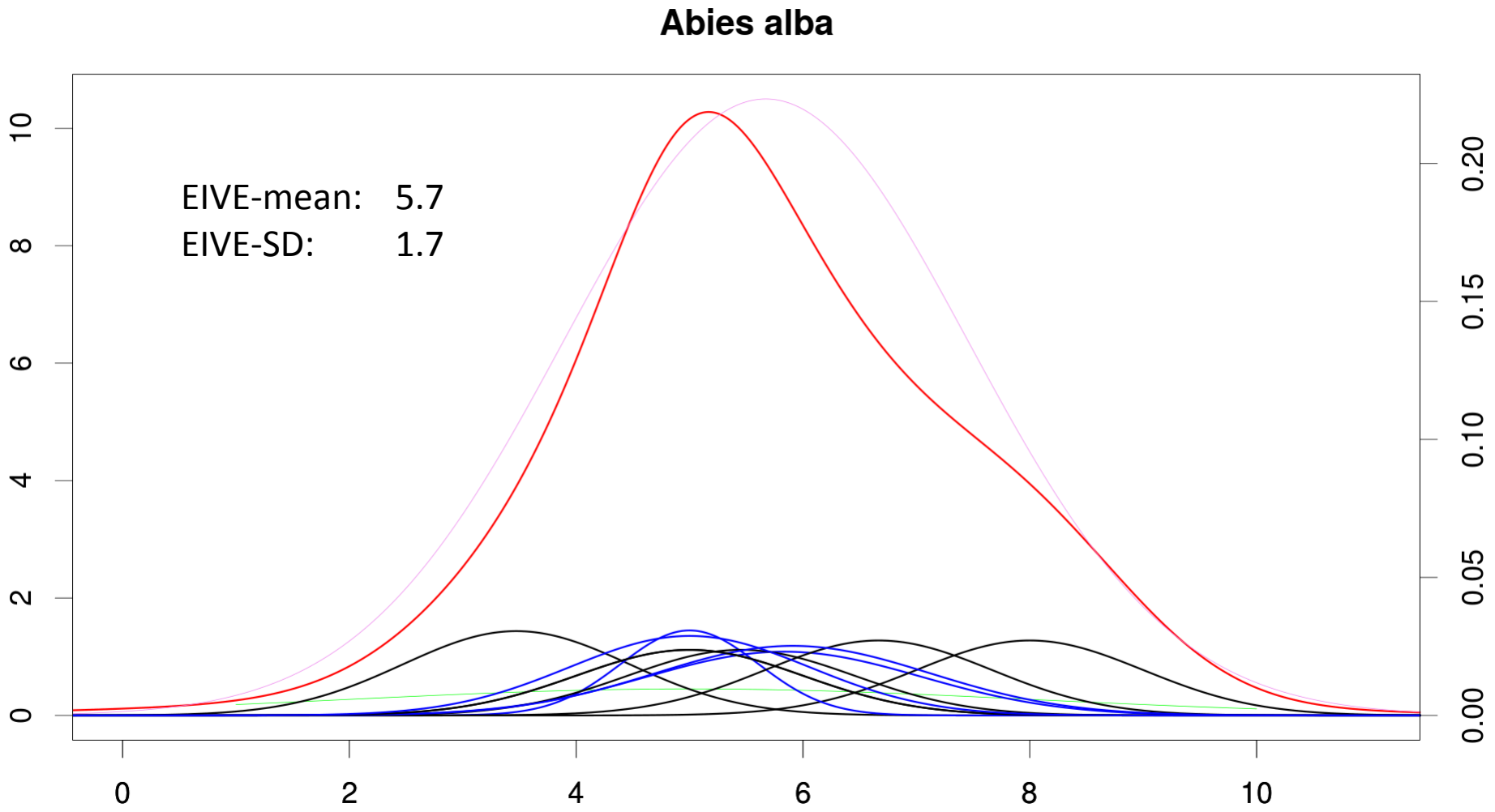
2. **Rescale the national F-values (means/optima) to a continuous 0-10 scale**
   ► linear transformation
   ► optimum for x-values set to the mean of the national EIV system

3. **Transform the national variance information to the same scale (EIV-SD)**
   I (normal values): SD = 1
   II (small letters): SD = 2
   x: SD = 3
   range: SD = 1/3 of the range after rescaling

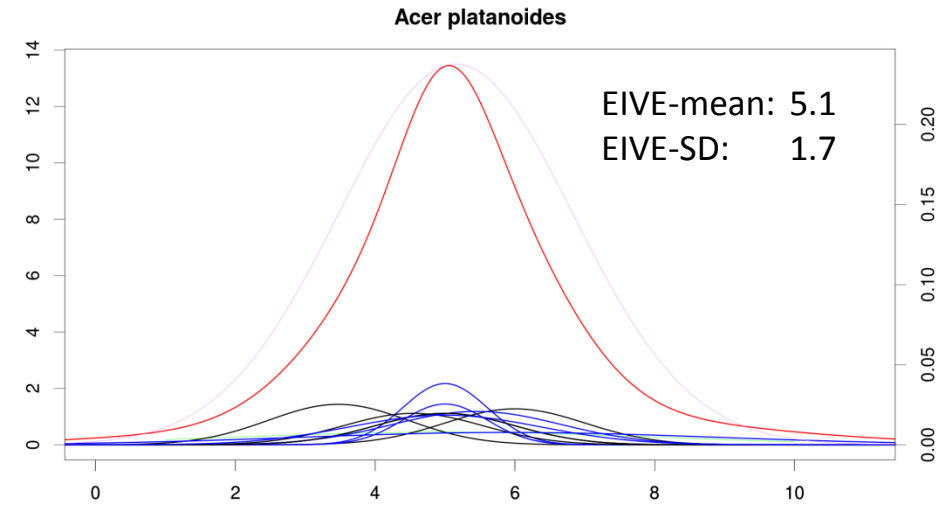
4. **Sum density curves of national normal distributions to a European total**
   ► territories weighted by $\log_{10}$-transformed area
   (Faroer = 1.0, European Russia = 4.4)

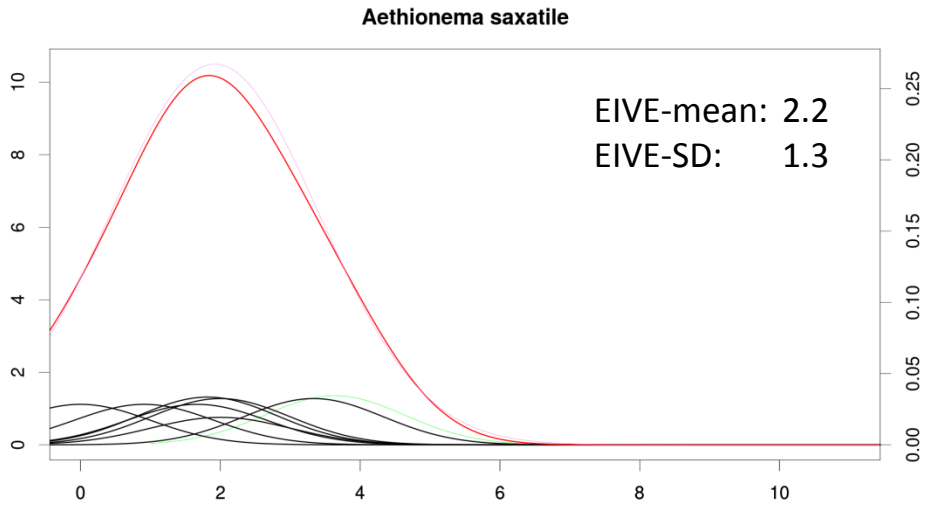
5. **Derive European optimum and SD**
   ► fitting a normal distribution to the irregular distribution curve

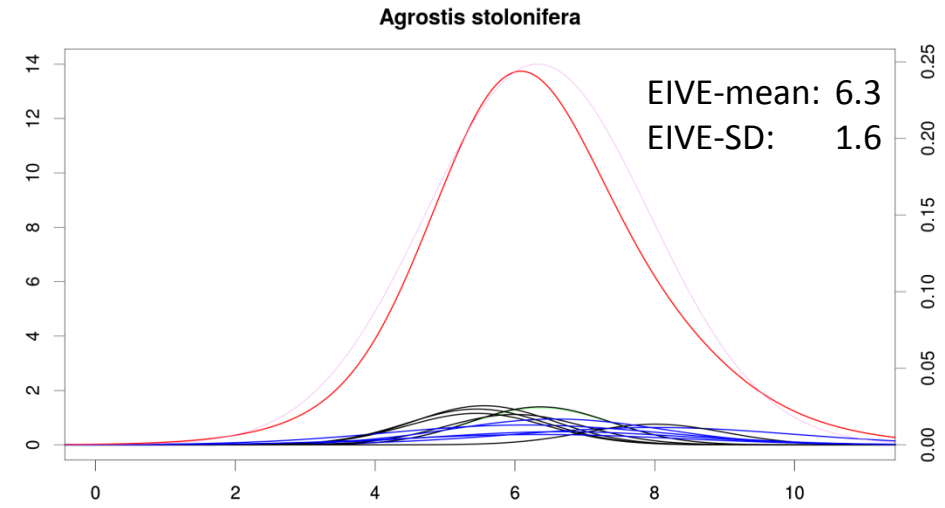
The F-value (moisture): Abies alba

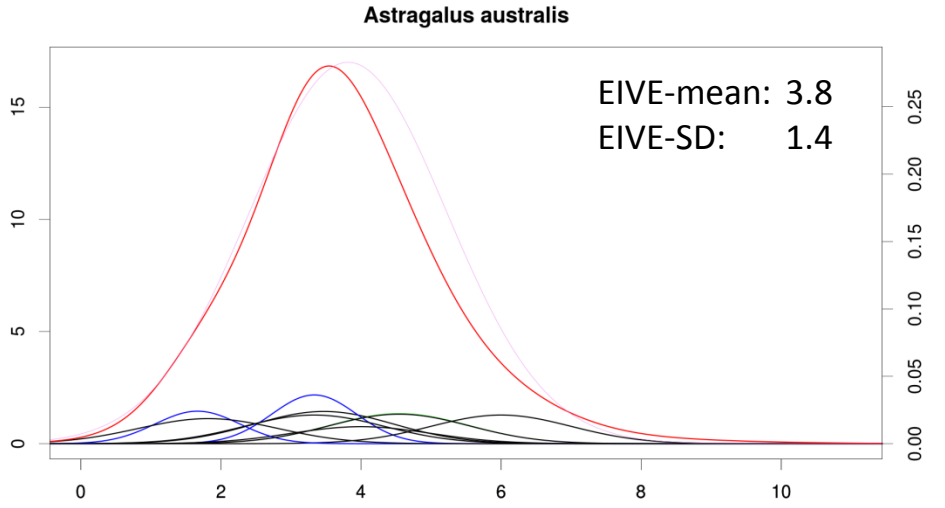


The F-value (moisture): other examples



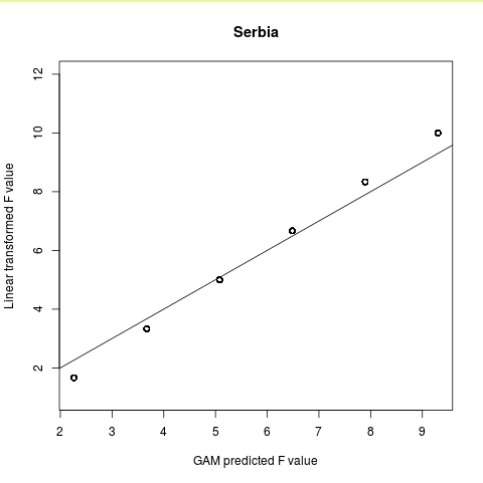


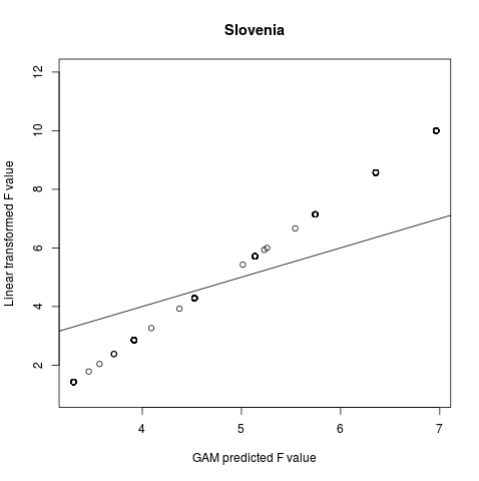


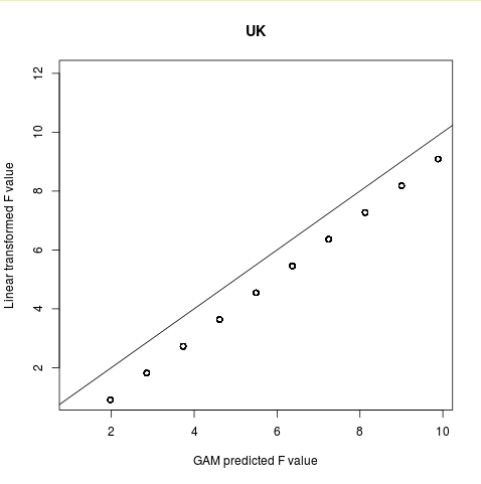


The F-value (moisture): remaining problems

1. **Simple linear rescaling of national EIV values to EIVE scale not appropriate in all cases**







2. **Check for outliers (i.e. extreme differences in rescaled optima)**

3. **Implement EuroSL (see poster of Jansen et al. today No. 54)**
   - ► Match synonyms and other corresponding names
   - ► Use taxonomic hierarchy

Outline of EIVE 1.0

- **„Consensus list“ of all available national EIV systems**
  (with no attempt to improve the assessments)
- **Only vascular plants**
- **Core set of parameters that are particularly important and well covered:**
  at least F, R and N
- **All EIVE parameters with optimum (scaled to 0–10) and SD**
- **Additionally: provision of all national parameters matched to EuroSL**
  except those national lists where copyright does not allow re-publication
- **Publication as open access database in the course of 2016**
  accompanied by a planned database paper in *Applied Vegetation Science*
- **Full integration intended into:**
  - *JUICE*
  - *EVA*
  - *SynBioSys Europe*

Options of EIVE 1.0

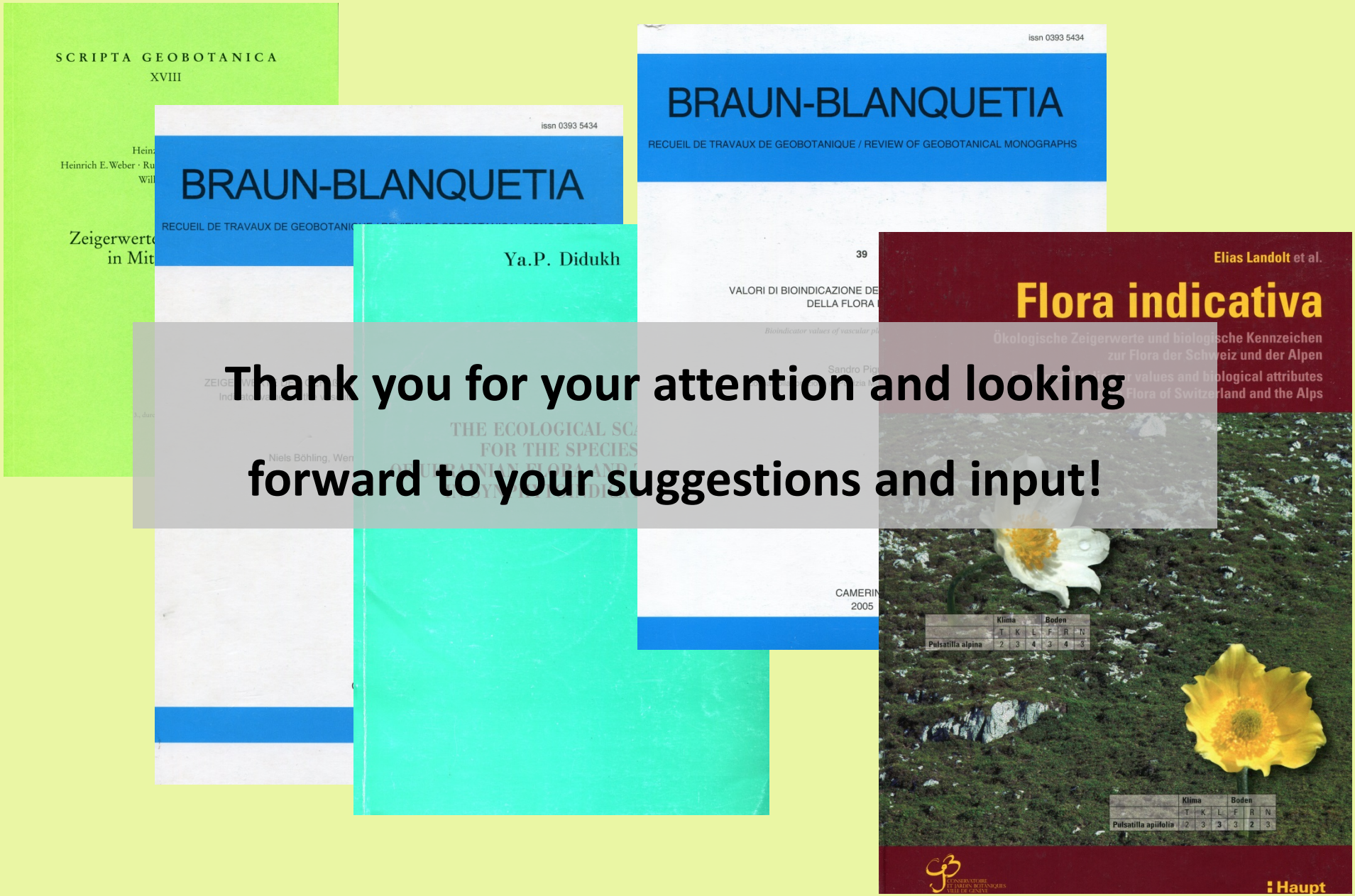
- **Efficient and consistent biodindication in multinational projects or in regions without national EIV system**
  - including the option to use the variance information
- **Testing ecological theories**
  - shift of ecological optima along biogeographic gradients
  - niche widths vs. location within species‘ ranges or species functional traits

  […]

Visions for future releases of EIVE

EIVE will be published in compatible versions, allowing for the successive improvement and expansion of its content, e.g.

- **Bryophytes, lichens and macro-algae**
- **Further parameters**
- **Expansion to all taxa occurring in Europe:**
  - using co-occurrence data from EVA
- **Additional regional releases:**
  - using co-occurrence data from EVA
- **Improvement of the expert assessments in EIVE by:**
  - co-occurrence data from EVA
  - using plots with measured environmental data from EVA (e.g. pH)
- […]



Thank you for your attention and looking forward to your suggestions and input!