Arachnida

Úvod do terénní zoologie bezobratlých

Stano Pekár

Arachnofauna

Araneae

Pseudoscorpiones

Acari

Opiliones

Habitat

|	Araneae	Opiliones	Acari	Pseudoscorpiones
soil	present	absent	present	absent
litter	present	present	present	present
epigeon	present	present	present	present
vegetation	present	present	present	absent
shrubs	present	present	present	absent
trees	present	absent	present	present
air	present	absent	present	present
water	present	absent	present	absent
cave	present	present	present	absent
building	present	present	present	present
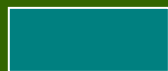
present

absent

Literature
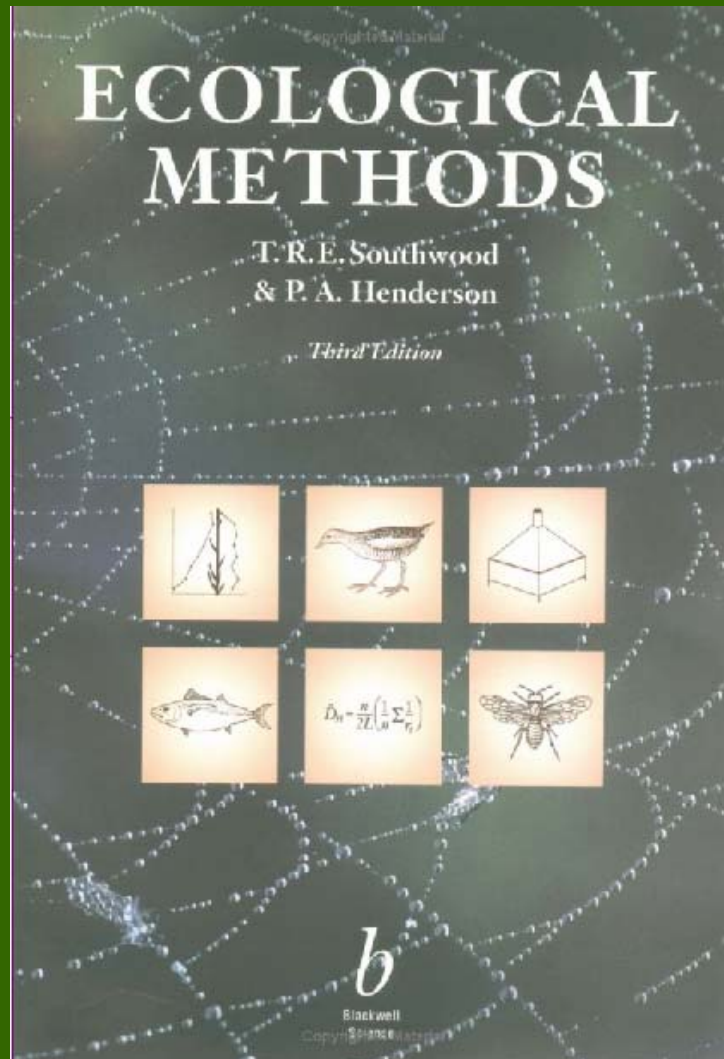
Southwood R. & Henderson P.A. (2000). *Ecological Methods*. Blackwell.
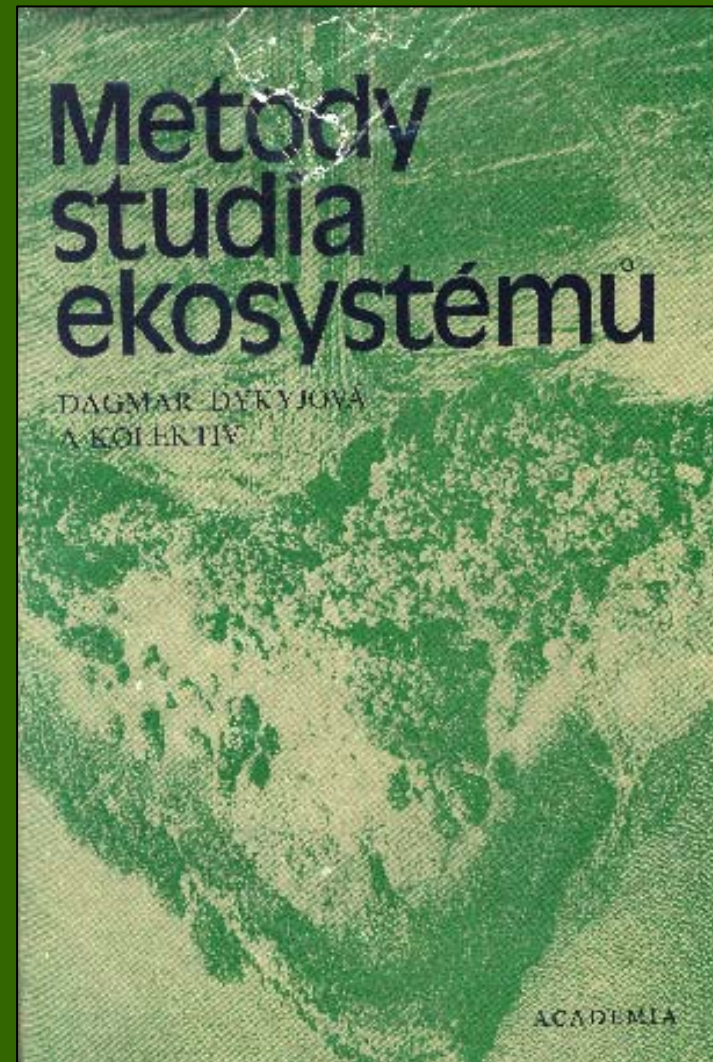
Dykyjová D. a kol. (1989). *Metody studia ekosystémů*. Academia.

Field sampling

Population sampling

Study:
- extensive - large area will be sampled once → **faunistic survey**
- intensive - repeated observation of area → **ecological survey**
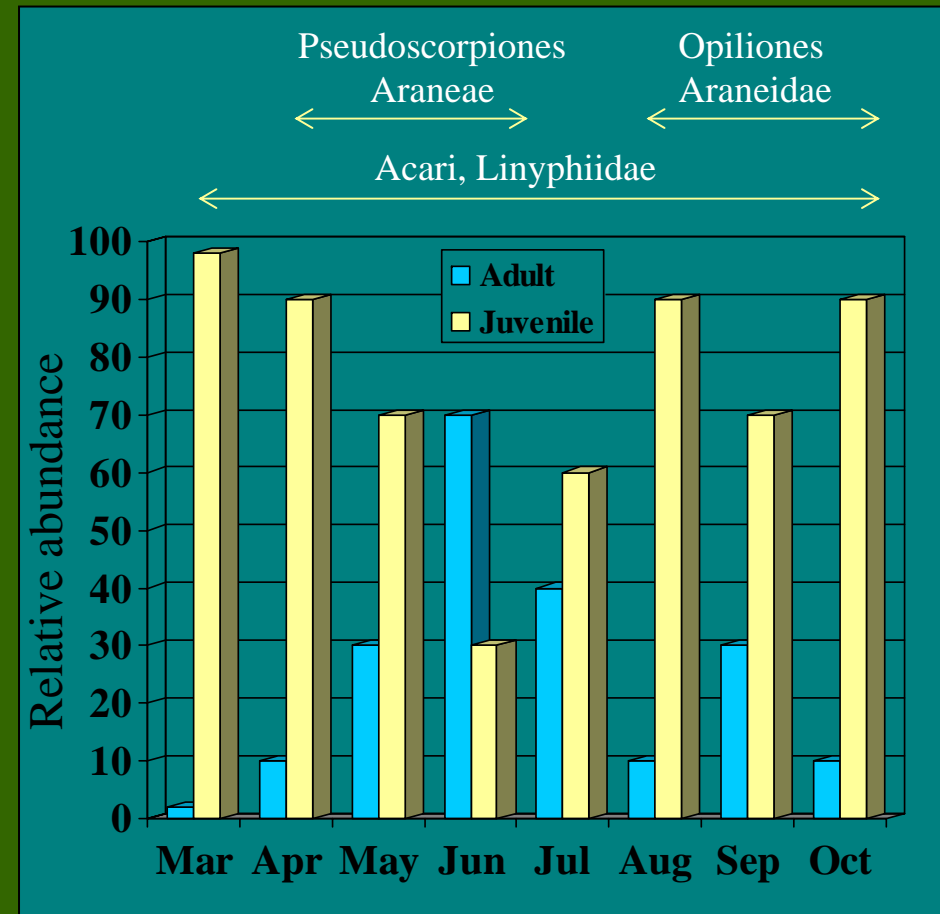
Timing of sampling:
- depends on phenology

Size of sampled area:
- large for rare, small
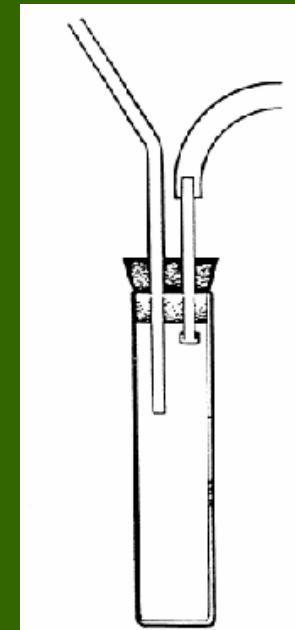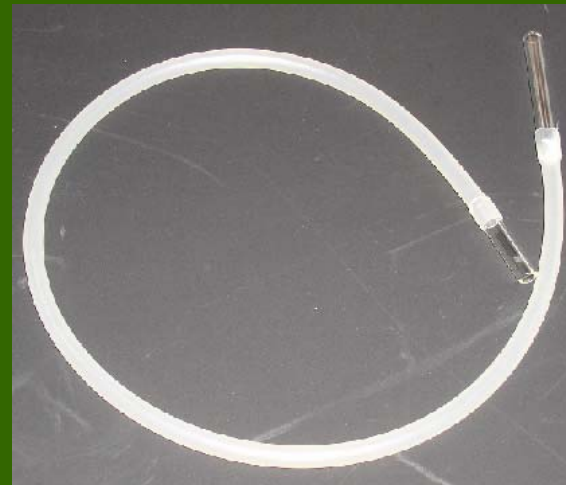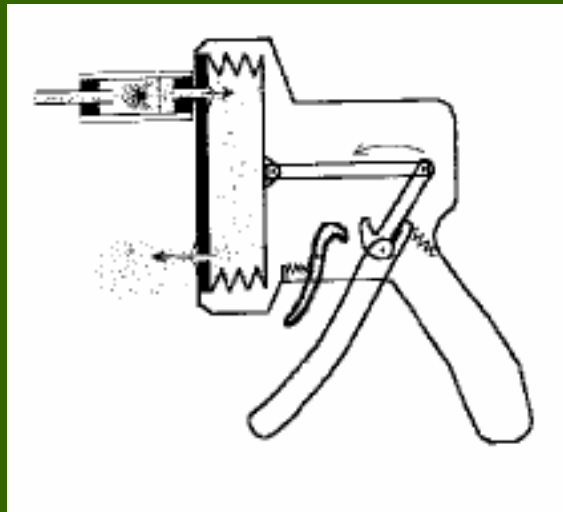for abundant species

Population estimates:
- absolute - density per unit area
- relative - catch per unit time

Relative methods

Hand sampling

• to sample arachnids under stones, from cracks, on bark, on rocks, in caves, on walls
• using pooter (aspirator), brush, pincer, tube or a suction gun

Catch *per* unit effort

- record of a spider
- used for conspicuous (large) species, webs, retreats, eggsacs

Aerial sampling

- to sample ballooning individuals (aeroplankton)
- using special sucking aerial traps: Johnson-Taylor, rotary trap
- segregate capture in time

Pitfall sampling

- to sample arachnids mobile upon epigeon
- using pitfall traps consisting of a jar with a cover
- filled with salt water, 4% formaldehyde, ethyleneglycol + detergent


Pitfall Trap

liquid
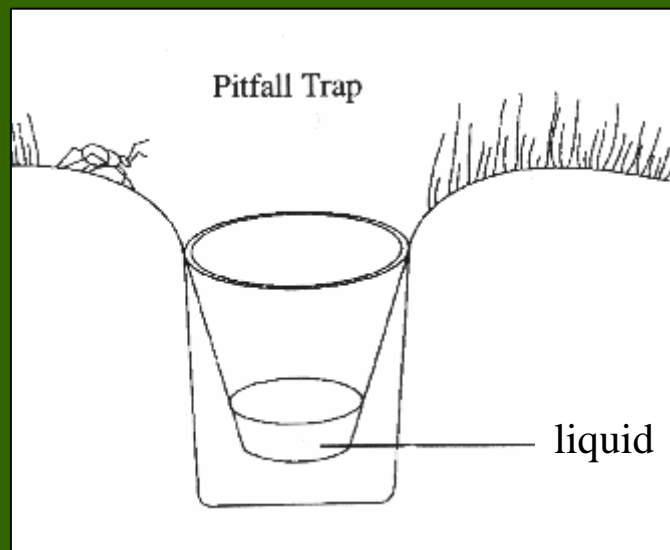
- traps collect continuously
- cheap, low effort
- activity depends on sex, circadian activity, weather, reproduction, dispersal
- arranged in a grid or in a row
- with exclusion barriers
- diameter of the trap selects captured individuals
- efficiency 0-40 %
- with timing device

Shelter sampling

- to sample individuals on tree trunks during overwintering
- using corrugated paper bands
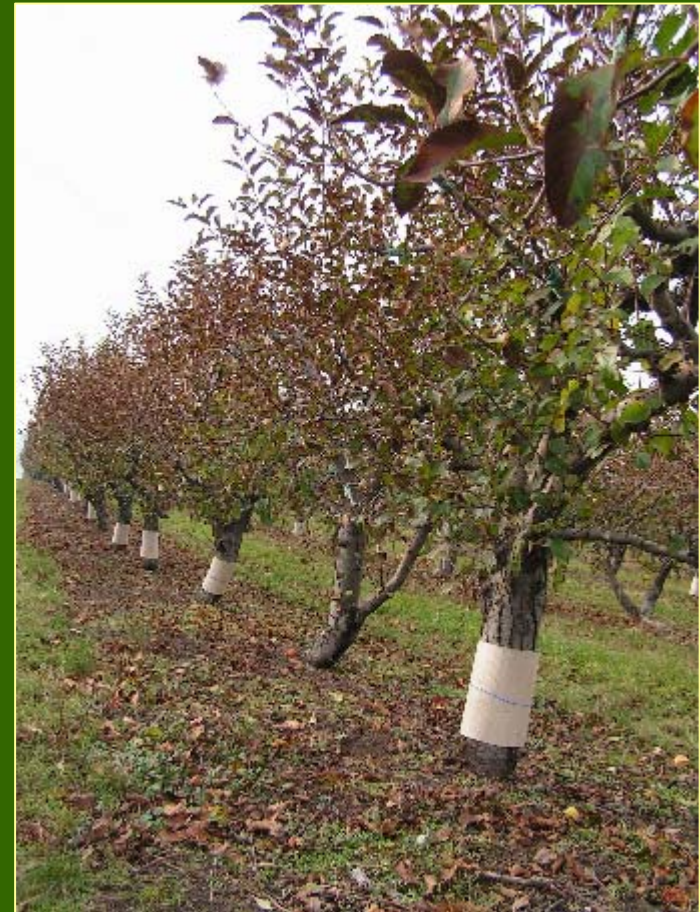
Absolute methods

Sweeping

- to sample arachnids on low vegetation
- using round sweeping net

Beating

- to sample arachnids on tree crowns and bushes
- using beating tray and rubber/wooden stick or shaking by hand
- colour of the cloth should be light
- in the bottom with a container
- not used after rain, during fruit maturation or leaf falling

A. Corner support

1m   1m

Frame

Canvas sheet (white)

1m   1m
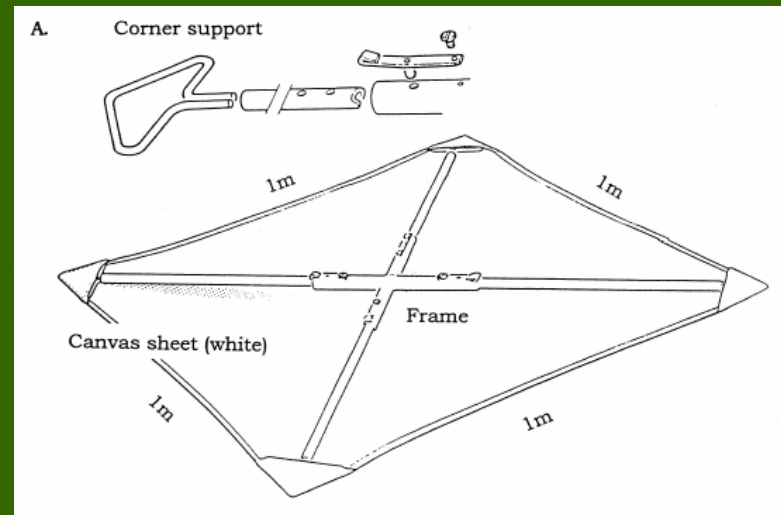
Suction sampling

- to sample arachnids in epigeon, on plants and on branches
- using D-VAC garden blower with a net
- efficiency 50-70%, ineffective for mobile species
- not used on wet soil, tall (> 15 cm) and dense (grassland) vegetation

Sieving

- to sample arachnids in litter
- using a sieve and a cloth or tray

Specimen transport

Dead specimens
- put in ependorf tubes, plastic tubes, filled with ethanol
- live are put in plastic tubes with piece of grass, leaf, moistened cloth with rubber or foam stop

Labelling
- labelled using permanent ink-pen
- use pencil on labels of tubes with ethanol

Transport
- in the plane, bus, car, train
- put in plastic bag to keep humidity and at cold place
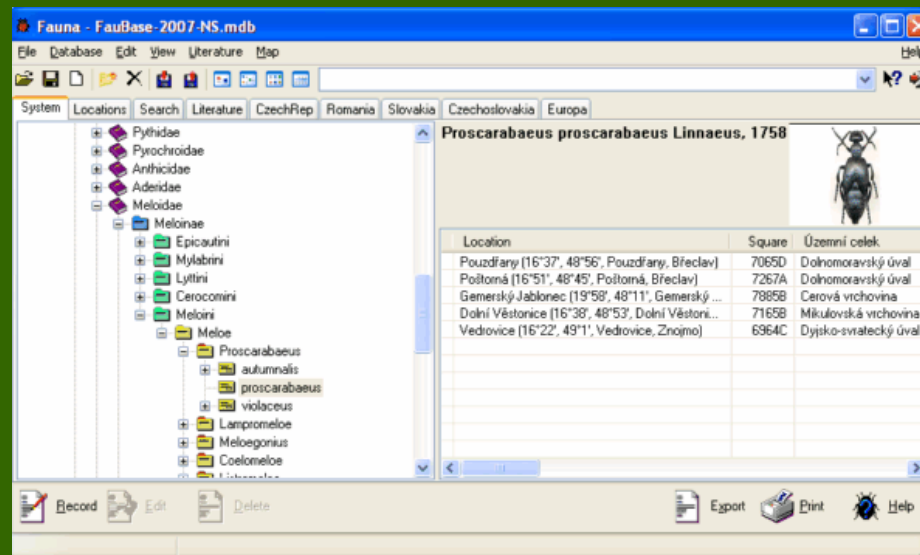
Specimen collection

Labels

• locality, GPS coordinates, habitat, date, hour (?), collector (leg.), identified (det.)

• print on cardboard paper using inkjet printer, write with a pencil or black-ink

Database

• Excel, Access, faunistic software (P&M software) Fauna 2011

Specimen storage

• individually or together into glass tubes
• tubes are placed in a jar with a lid with rubber and filled
with 70-90% ethanol

Laboratory rearing

- singly in tubes with a layer of Paris of plaster
- labelled on outside with permanent ink-pen
- moistened regularly (3-5 days) with drops of water
- foam rubber stop or pierced plastic plug
- fed with prey in regular intervals

- kept clean (without prey remnants) to avoid attack
by fungi and parasitic mites

Chambers

Physical conditions
- Humidity - difficult to control
- Temperature - constant between -10 and 40 °C
- Light regime - light:darkness long day 16:8, short day 10:14

Experimental Design

Completely randomised design

- one treatment level is randomly assigned to one individual
- number of individuals is high
- identical number of observations per treatment is optimal
- in a study with 3 factors: sex (2 levels), age (3 levels), prey (5 levels) = 2 x 3 x 5 = 30 treatment combinations
- if each treatment has 10 replications = 300 individuals
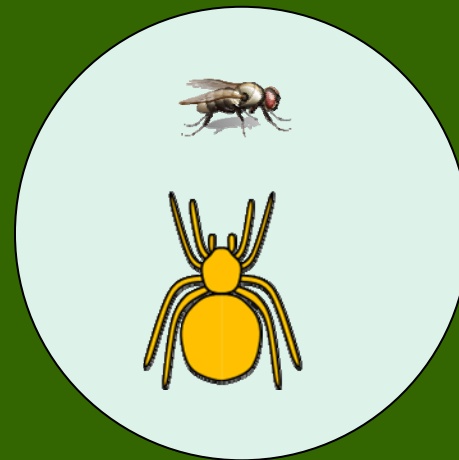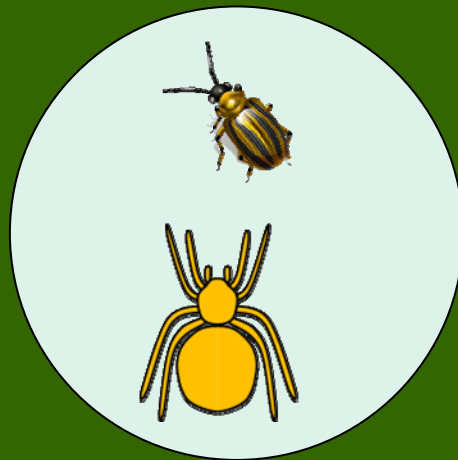
Latin square

• used in heterogeneous environment where two gradients can run in orthogonal directions
• position of treatments is random only in the first row, in the remaining rows it is constrained - so that each treatment is in each column only once
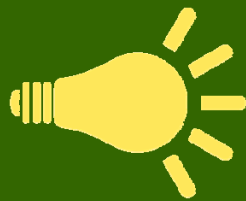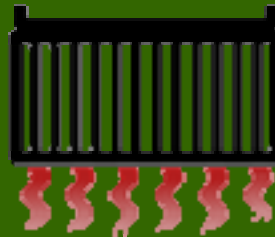
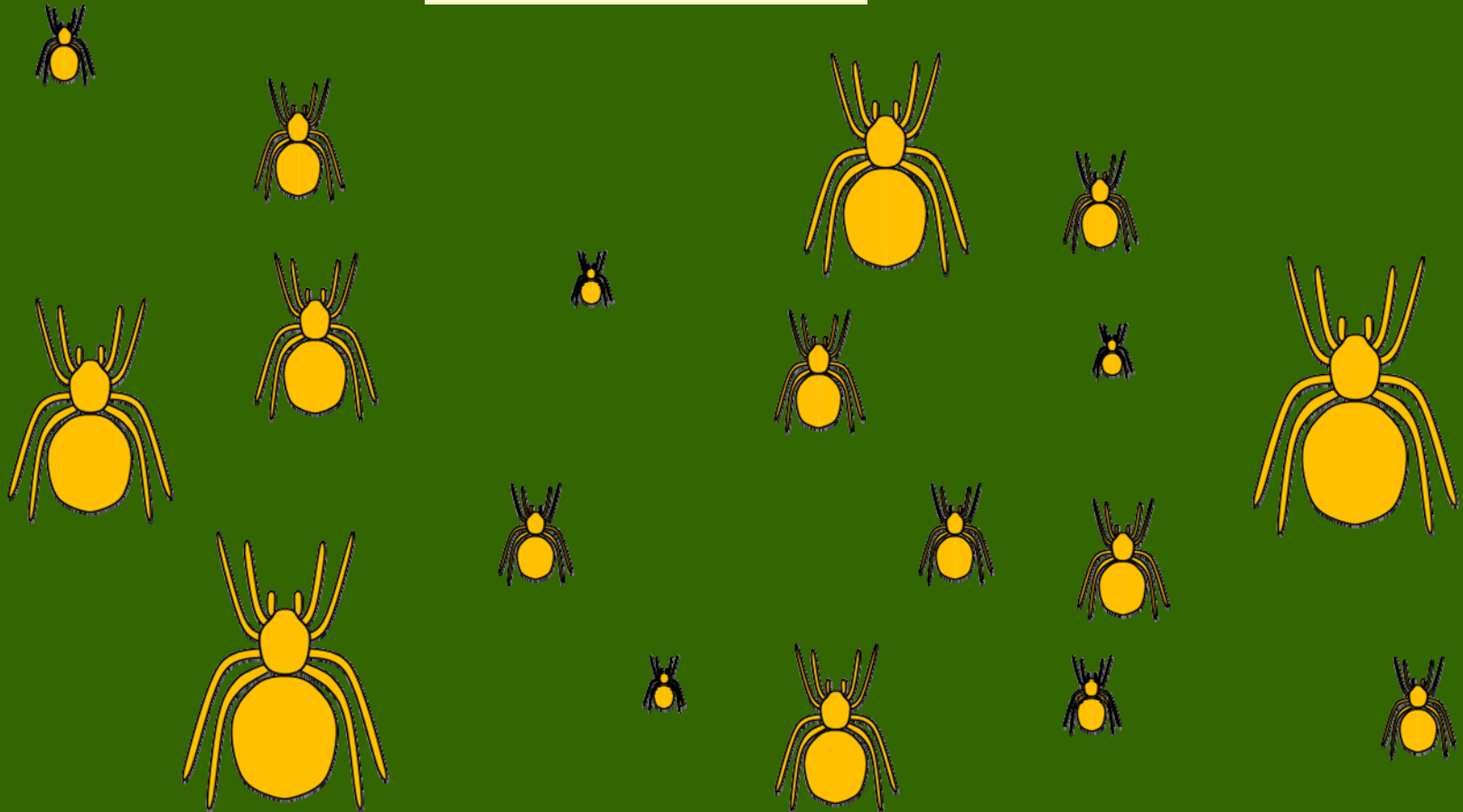| A	B	C	D
B	C	D	A
C	D	A	B
D	A	B	C

Randomised complete block

- repeated use of the same individual
- smaller number of individuals is used
- in a study with 3 factors: sex (2 levels), age (3 levels), prey (5 levels) = 30 treatment combinations
- 2 treatments have 10 replications each = 60 individuals
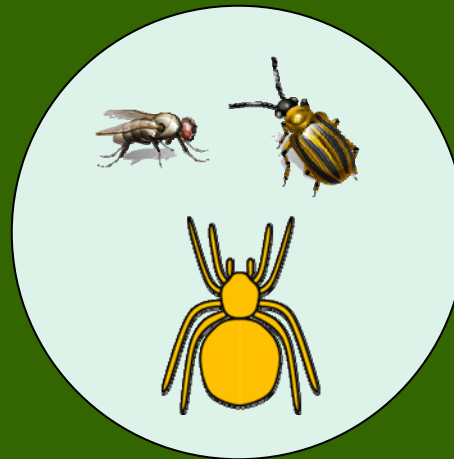
RCB is better than CRD

$$\sigma^2_{\text{among}} > \sigma^2_{\text{within}}$$

Behavioral sampling

Focal-Animal Sampling
- all actions of animal are recorded for a specified time period

Scan Sampling
- the behaviour of all individuals in a group of animals are recorded at predetermined time intervals
- states are recorded instead of events

Sequence Sampling
- record interactions
- sampling periods begin and end when a behavioural sequence begins and ends

Ethogram

- lexicon of the behaviour of a species
- constructed by observing and recording all of the activities that an animals performs

Behaviour patterns:

Event
- patterns of relatively short duration (discrete body movements)
- record frequency of occurrence

State
- patterns of relatively long duration (prolonged activities)
- record their duration

Experiment

- Observe prey capture of 2 prey type
- Record sequences of behaviour
- Measure latency to capture of 2 prey types

Mogrus sp.