Biometry. Lecture 3

Alexey Shipunov

Minot State University

January 18, 2012

Outline

Outline

Previous final question: the answer

How to sample 10 items from `data` object? Write R command.

Previous final question: the answer

How to sample 10 items from `data` object? Write R command.

```
> sample(data, 10)
```

Course schedule

- Lectures: WF 7:30–8:50 am
- Labs: Tu 3–6 pm

Data

How to obtain data

Observation and experiment

- Observation: minimal influence
- Experiment: direct influence

Problems of observation

- Too many irrelevant factors
- It is hard to minimize the influence

Problems of experiment

- Control group (and possibly single- or double-blind method) are needed
- Measuring of influence

Data
Population and sample

Population and sample

- (Statistical) population—all research objects
- Sample—subset

Errors of sampling and complete investigation

- Representation: sample may not adequately represent population
- Accuracy: the complete (total) investigation always has less accuracy

Data
Principles of sampling

Replication

- Replication: Every effect should be researched several times
- Every replicate should be independent!

How many replicates?

- As many as possible
- 30

R break: commands so far

```
q() # Exit
download.file() # Download from Internet
scan() # Read simple (!) file from dist
sample() # Sample ;)
```

R break: help!

```
> ?q
> ?download.file
> ?scan
> ?sample
```

R break: `Arrow Up` and `Tab` keys

```
> sam # Press Tab then press Enter
> # Press Arrow Up
> down # Press Tab then "f" then Tab again
```

Summary

- Data comes from **observations** and **experiments**
- Complete (total) investigation very often is **not** preferable over sampling

For Further Reading

A. Shipunov.
Biometry [Electronic resource].
2012—onwards.
Mode of access: `http://ashipunov.info/shipunov/school/biol_299`

P. Dalgaard
Introductory Statistics with R. 2nd edition.
Springer, 2008.
Appendix A.

Minot State UNIVERSITY