

Systematic Botany. Lectures 1–7

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Minot State University



Outline

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- Tools

- Grading

- Course schedule

- Field trips

Plants and plant families

Important details of plant construction

- Flowers and leaves



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Course in general

Description



Course

- ▶ Strictly practical, field-oriented class
- ▶ Based on herbarium collection
- ▶ Involves determination of families, genera and species most common in North Dakota



Instructor

- ▶ Dr. Alexey Shipunov
- ▶ Office: Moore 229
- ▶ Office Hours: Mondays, Wednesdays and Fridays, 11 am to 12 am
- ▶ Phone: 858-3116
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Lectures (seminars) Mondays, Wednesdays and Fridays, 1:00 a.m. to 1:50 a.m., Moore 213. Plant determination mostly, from time to time I will give a theoretical lecture and present identification keys. All determined plants must be signed with me.

Laboratories Thursdays from 1:00 p.m. as a field trip involving transportation within and/or out of town (approximately 6 hours every second week from August to October), or in Moore 213 (approximately 3 hours, in November and December).

For the purpose of field trips, class is divided into **two sub-sections**. Your sub-section has a field trip every second week from August to October. Within sub-section, we **work in pairs**. Each pair is responsible for all plants which they collect during field trips. Apart from the field trip, **each pair have a weekday duty** of collection management. On Sundays, I will be on duty myself.



Course in general

Tools



Web site

`http://ashipunov.info/shipunov/school/
biol_448/`



North Dakota plant checklist

<http://ashipunov.info/shipunov/fnddb/>



References

- ▶ Van Bruggen, Th. 1996. **The vascular plants of South Dakota**. 3rd ed. University of South Dakota, Vermillion, SD.
- ▶ Larson, G.E. 1993. **Aquatic and wetland vascular plants of Northern Great Plains**. USDA Forest Service, Fort Collins, CO.
http://www.fs.fed.us/rm/pubs_rm/rm_gtr238.pdf
- ▶ **Flora of North America** [ongoing]. <http://efloras.org>
- ▶ **Flora of Great Plains**. 1986. Kansas State University, Lawrence, KS.
- ▶ Johnson, J.R. & Larson, G.E. 2007. **Grassland plants of South Dakota and Northern Great Plains**. South Dakota State University, Brookings, SD.
- ▶ Hickey, M. and King, C. 2000. **The Cambridge illustrated glossary of botanical terms**. Cambridge University Press, Cambridge.



Course in general

Grading



Exams

- ▶ Four exams are given during the semester
- ▶ Exams will be based on plant identification and herbarium presentation
- ▶ Two failed exams mean the failed class



Labs

- ▶ This is a **laboratory course**, meaning that receiving zero points for more than one laboratory results in a failed course.
- ▶ Grading of laboratories is based on collection performance, reports and/or drawings. Field trips might be graded with a delay because you will need to finalize your herbarium first.



Absence

There are five legitimate reasons for absence on labs and exams:

1. emergency situations,
2. attested medical conditions,
3. military duty,
4. participation in MSU sports events,
5. dependent sick leave.

Absence from exams or laboratories must be announced to the instructor in advance.



Points

A total of 640 points can be earned and are distributed as follows:

Exams : 400 points

Laboratories : 240 points (20 points per singular lab, 40 points per field trip)

Grading points may vary between exams and labs.



Letter grades

- ▶ $A \geq 90\%$
- ▶ $B \geq 80\%$
- ▶ $C \geq 70\%$
- ▶ $D \geq 60\%$
- ▶ $F < 60\%$

A minimum of one letter grade will be deducted from the grade for academic dishonesty / plagiarism.



Course in general

Course schedule

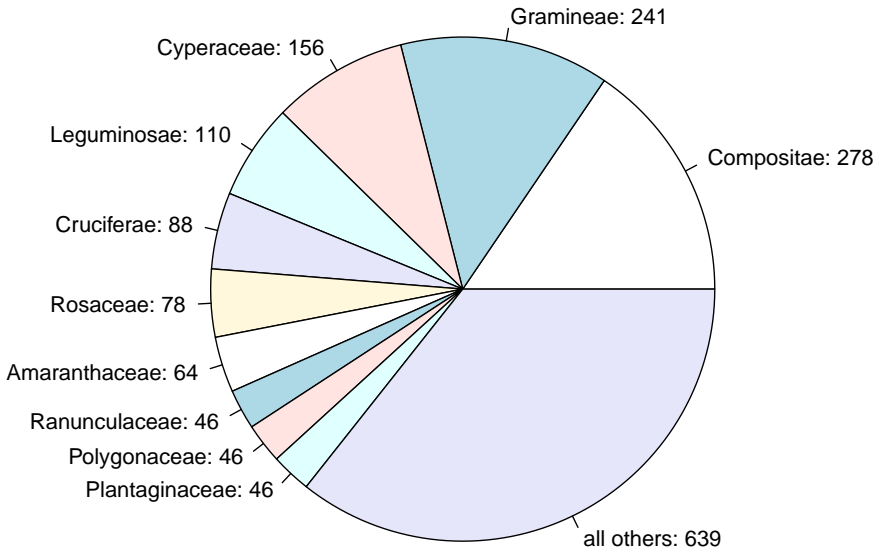


Three piers

1. Determination of families
2. Determination of genera and species
3. Preparation of herbarium



Family sequence taken from frequencies

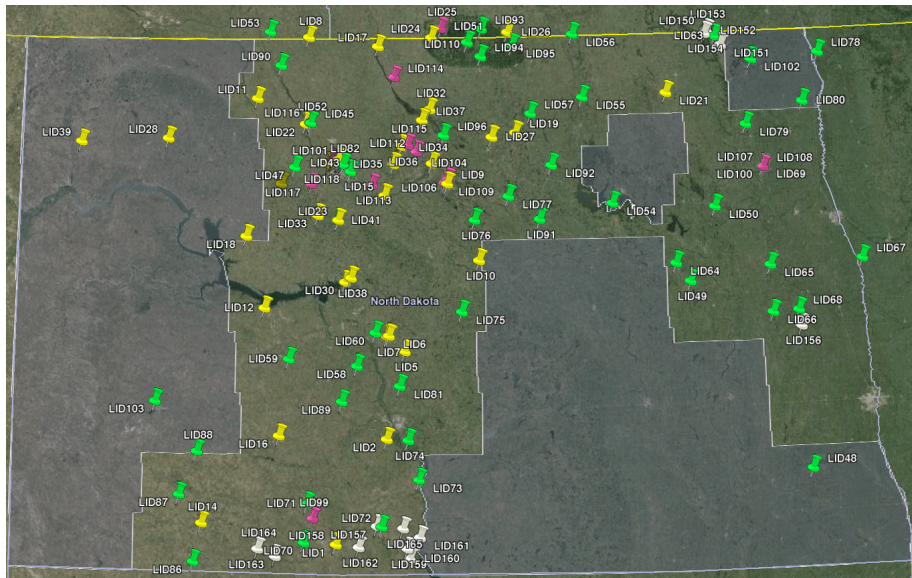


Course in general

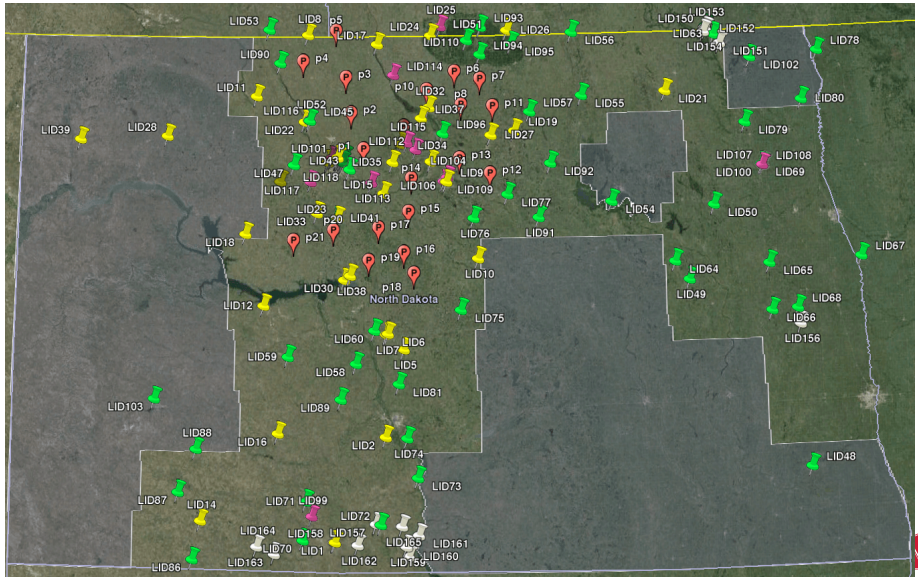
Field trips



North Dakota coverage so far



North Dakota coverage: plans



Why do we need to know plant families

- ▶ If you know the family, you know characters of hundreds and thousand of genera and species, you may even predict them
- ▶ There are 250,000 species of flowering plants and only 350 families; knowing family will significantly reduce efforts
- ▶ In science, everything is constantly changing, but plant families are exception—they are stable for more than 300 years



History of plant families

- ▶ Famous **Carolus Linnaeus** made the classification of all organic world but he did not use “natural groups”, his classification of plants was artificial
- ▶ French scientist **Michael Adanson** first in the world apply “bioinformatic” methods to the plant diversity and identify plant families
- ▶ **Antoine de Jussieu** adapted this approach to the natural gardening and make these families “alive” as garden beds in Paris.
- ▶ In 90% of cases, molecular methods confirmed Adanson’s findings



Beware!

- ▶ Only Latin names are valid; as to common names, I recommend to ignore them
- ▶ Plant systematics is a science so names and concepts are changing over time
- ▶ I use recent, typically broad concepts which might be different from books you use, and you are advised to follow my understanding
- ▶ I use traditional family names so no Asteraceae but **Compositae**, no Poaceae but **Gramineae**, and so on



Important details of plant construction

Flowers and leaves

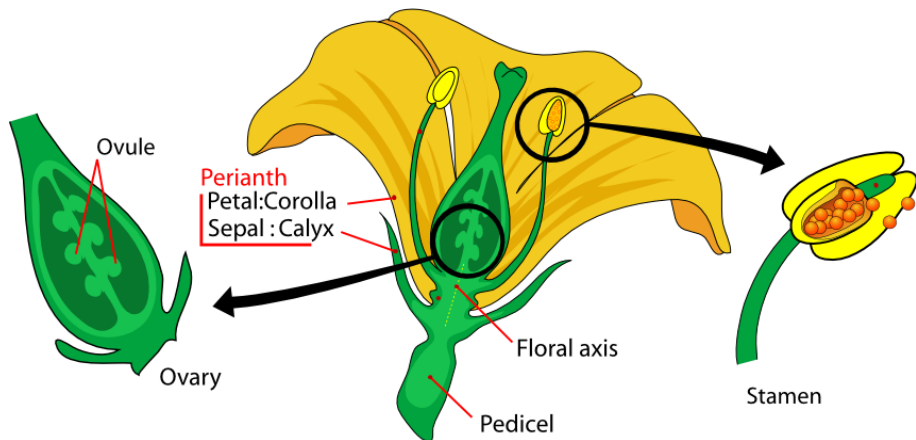


Plant construction: flowers

- ▶ Solitary or in inflorescences of multiple kinds
- ▶ Symmetry: actinomorphic (radial, star-like) and zygomorphic (bilateral, human-like, with left and right sides)
- ▶ Number, size, position, fusing of: tepals, sepals, petals, stamens, pistils and carpels
- ▶ Position of ovary: above (superior) or below (inferior) the other parts of flower



Plant construction: flowers

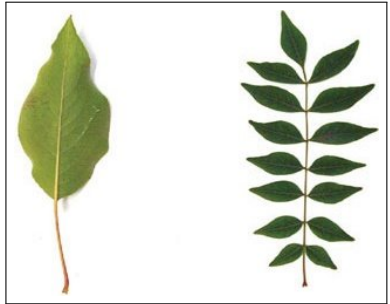


Plant construction: leaves

- ▶ Alternate and opposite leaves
- ▶ Simple (whole or dissected) and compound leaves



Plant construction: leaves



Subsection, pair and class ID

Everybody must know sub-section, pair partner and your day of duty!
Please provide also a class ID: piece of paper with your name and any four digits, from 0000 to 9999 in any combination.



Summary

- ▶ Download syllabus!
To know plant family, we should check:
- ▶ Position and structure of leaves
- ▶ Symmetry and number of flower parts



Family key

Presented as a separate resource



For Further Reading



A. Shipunov.

Systematic Botany [Electronic resource].

2011—onwards.

Mode of access:

http://ashipunov.info/shipunov/school/biol_448



A. Shipunov.

Flora of North Dakota: Checklist

2012—onwards.

Mode of access: <http://ashipunov.info/shipunov/fnddb>

