

# Ethnobotany. Lecture 4

Alexey Shipunov

Minot State University

August 31, 2016



# Outline

- 1 Main food source plants: grains
  - Ancient wheats
  - “Contemporary” wheats



## Herbarium collection movie



# Species and species groups

- Diploid species ( $2n = 14$ ): einkorn
- Tetraploid species ( $2n = 28$ ): emmer wheat, hard wheat
- Hexaploid species ( $2n = 42$ ): common wheat

Common wheat is a “genetic monster” with the chimeric genome.



# Spring and winter races

- Most cultivated species have two races
- *Winter race* does not flower if planted in spring; it typically grows under a snow and should be planted in autumn
- *Spring race* does not survive under snow; it should be planted in spring
- These two forms are partly genetically inherited; it is possible, however to change behavior from winter to spring (vernalization: hard selection + epigenetic effects)



# Main food source plants: grains

## Ancient wheats



# *Triticum monococcum*

- Eincorn, or *Triticum monococcum* is probably the most ancient cultivated plants ever (cultivated from neolithic age)
- Do not require irrigation, survive with low precipitation but yield is also low
- In spikes, spikelets have only one flower
- Relatively tall (up to 1 m)
- Now cultivated rarely, one of the last centers of cultivation is Spain



# Eincorn, *Triticum monococcum*





## *Triticum dicoccum*

- Emmer wheat (farro, *Triticum dicoccum*) has fragile spike and more than one flower per spikelet
- Sustainable for droughts, bacterial and fungal infections, insects, lower temperatures but has extremely low yield
- Still cultivated in some European countries (Italy, Albania); main food source in Ethiopia
- Used also as a genetic source for hybridization and selection



# Emmer wheat (*Triticum dicoccum*)



# Main food source plants: grains

## “Contemporary” wheats



## *Triticum durum*, hard wheat

- Hard wheat (*Triticum durum*) is a second most cultivated wheat, probably of Mediterranean origin
- Small-sized, fast-growing
- Almost exclusively self-pollinated
- Has high yield and grains of best quality among wheats containing more proteins



# Hard wheat (*Triticum durum*)



## *Triticum durum* 2

- Winter races are rare
- Requires irrigation
- Better suited for cultivation in tropics
- The highest diversity is now in Italy (widely used for a pasta!)
- Now widely cultivated in tropics (India, Africa)



## *Triticum aestivum*, common wheat

- Common (soft) wheat (*Triticum aestivum*) is a main cultivated wheat
- There are more than 4,000 cultivars of common wheat
- Small- and medium-sized but slow-growing when young
- Often cross-pollinated
- High yield, grains are rich of starch



# Common wheat (*Triticum aestivum*)



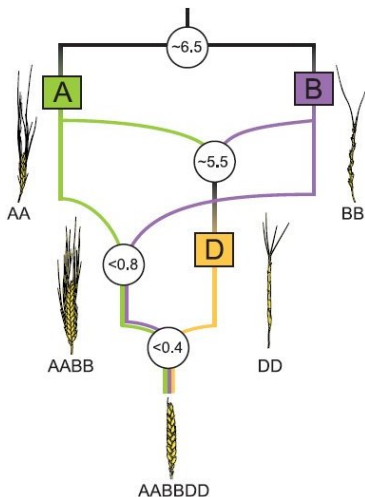


## *Triticum aestivum* 2

- Has many winter and spring races
- Typically, does not require irrigation
- Cultivated mostly in temperate and subtropical regions around the world
- Main cultivated wheat in U.S.



# Origin of wheats



- Tetraploid and hexaploid wheats are **inter-generic hybrids** *allopolyploids* between diploid wheats and *Aegilops* (goatgrass)!
- Tetraploid wheats have genome AABB (A from diploid wheats, B from *Aegilops speltoides*)
- Hexaploid wheats have genome AABBDD (D from *Aegilops tauschii*)



# Summary

- Wheats (*Triticum*) are ancient cultivated plants, originated in West Asia
- Tetraploid and hexaploid allopolyploid wheats are intergeneric hybrids



# For Further Reading



P. Stamp.

*Virtual cereal cultivar garden* [Electronic resource].

2008.

Mode of access:

<http://www.sortengarten.ethz.ch/?content=start>



A. Shipunov.

*Ethnobotany* [Electronic resource].

2011—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_310](http://ashipunov.info/shipunov/school/biol_310)

