Influence of snow cover on field crops' development

Lenka Hájková – CHMI Prague
Věra Kožnarová – Czech University of Life Sciences Prague
Tomáš Vráblík – CHMI Prague
Lenka Bartošová – Mendelu / CzechGlobe Brno

Phenology

- the study of periodically repeating stages in the life cycle of animals and plants as influenced by environmental conditions,
- predicting of crop development is fundamental,
- many aspects of agronomy,
- crop simulation models,
- intensive farming in Western and Central Europe

Material and Methods

- field crop phenology
- CHMI network (field crops, fruit trees, wild plants)
- 1984-2012
- volunteer observers
- field crops methodology
- Phenological Atlas (Coufal et al., 2004)
- PHENODATA
- CLIDATA

Material and Methods

- observed phenological phases of spring barley:
  - sowing, emergence, tillering, first node, second node, heading, beginning and end of flowering…full ripeness
- Strážnice (177 m asl, 17°19‘E, 48°54‘N)
- Pusté Jarkartice (275 m asl, 17°57‘E, 49°58‘N)
- Tis u Chotěboře (455 m asl, 15°30‘E, 49°42‘N)

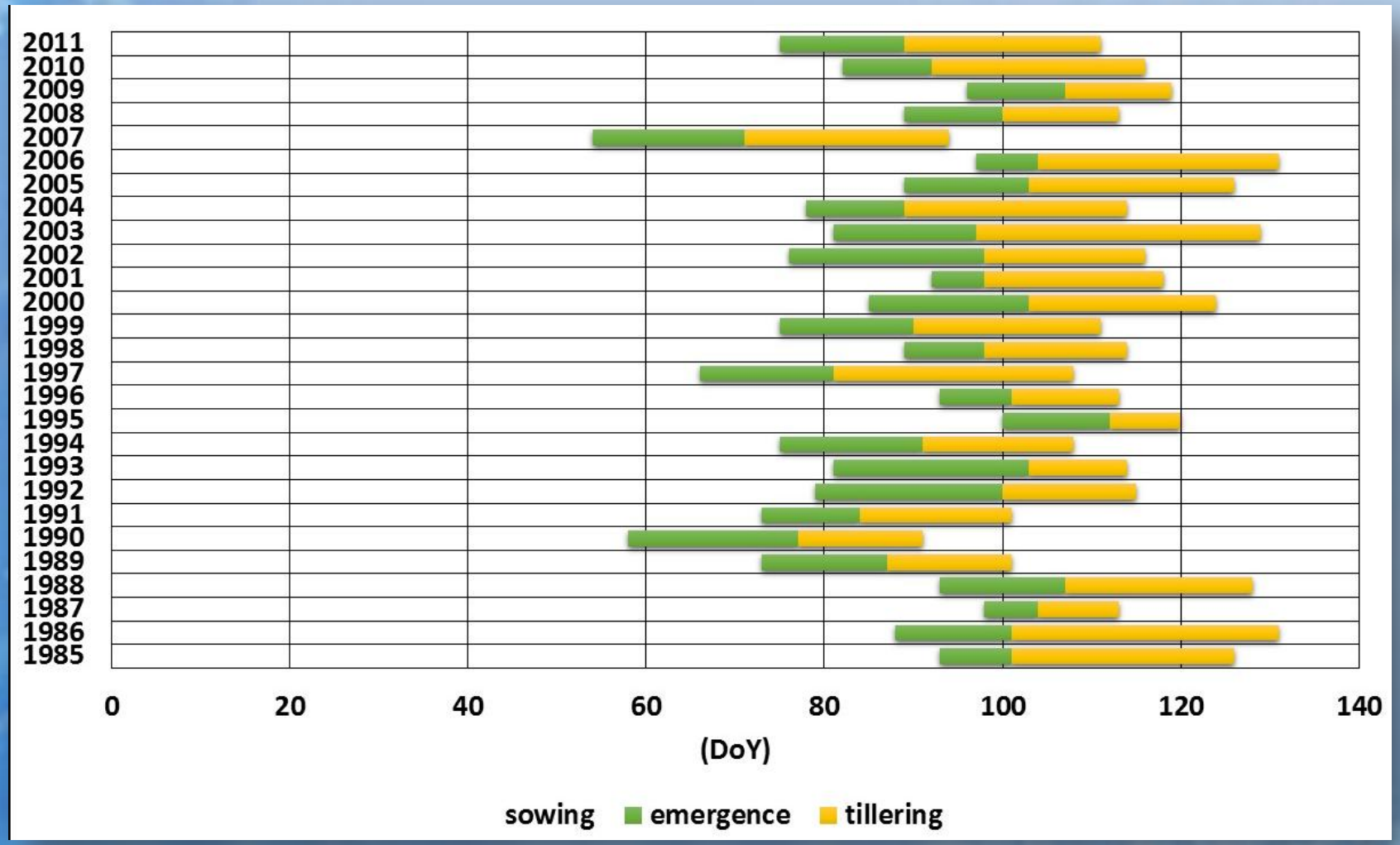
Material and Methods

Climatological stations:

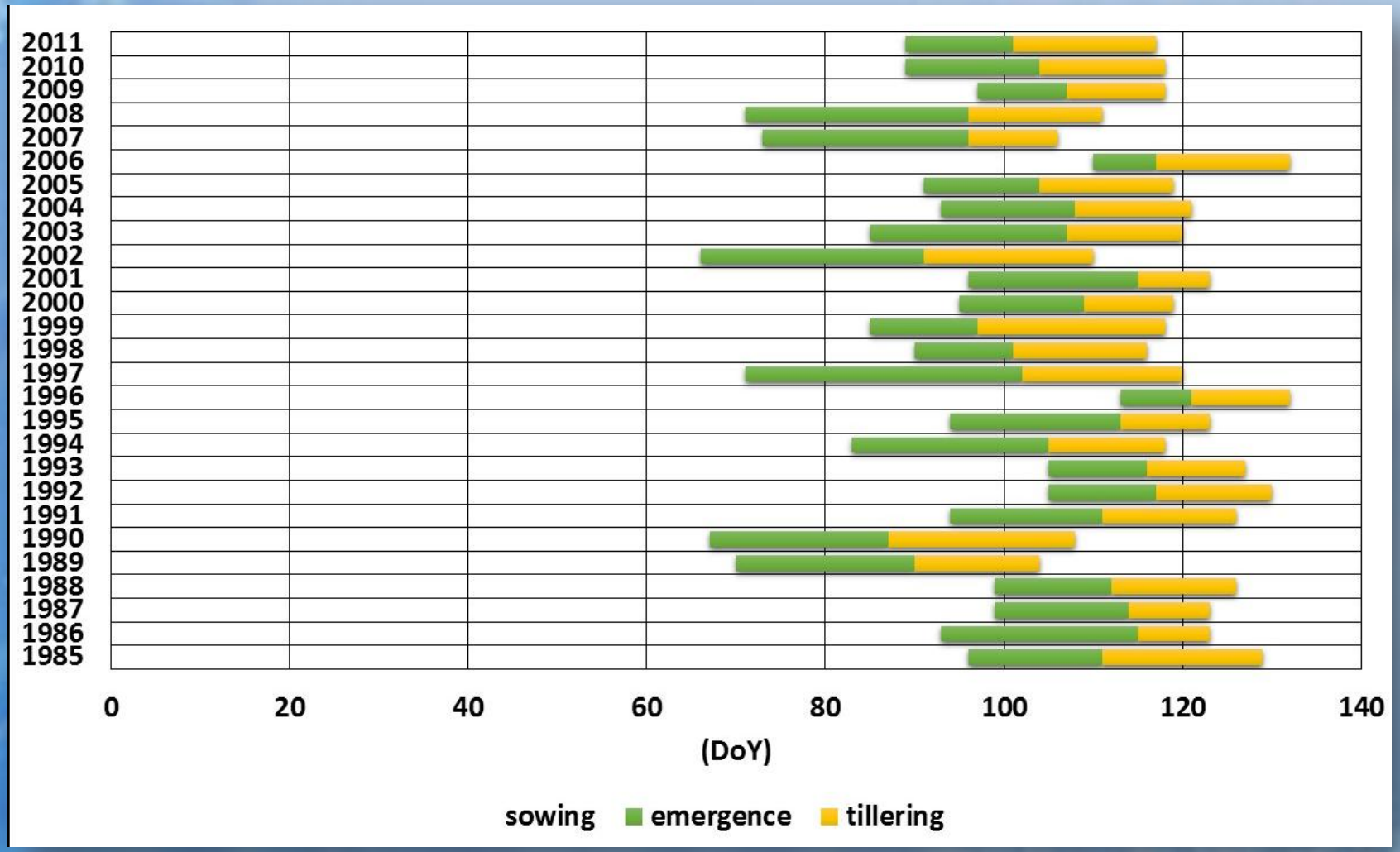
- Strážnice (176 m asl, 17°20‘E, 48°53‘N)
- Opava (270 m asl, 17°52‘E, 49°55‘N)
- Havlíčkův Brod (452 m asl, 15°34‘E, 49°36‘N)

- Standard climatic elements (...snow cover – new, total)

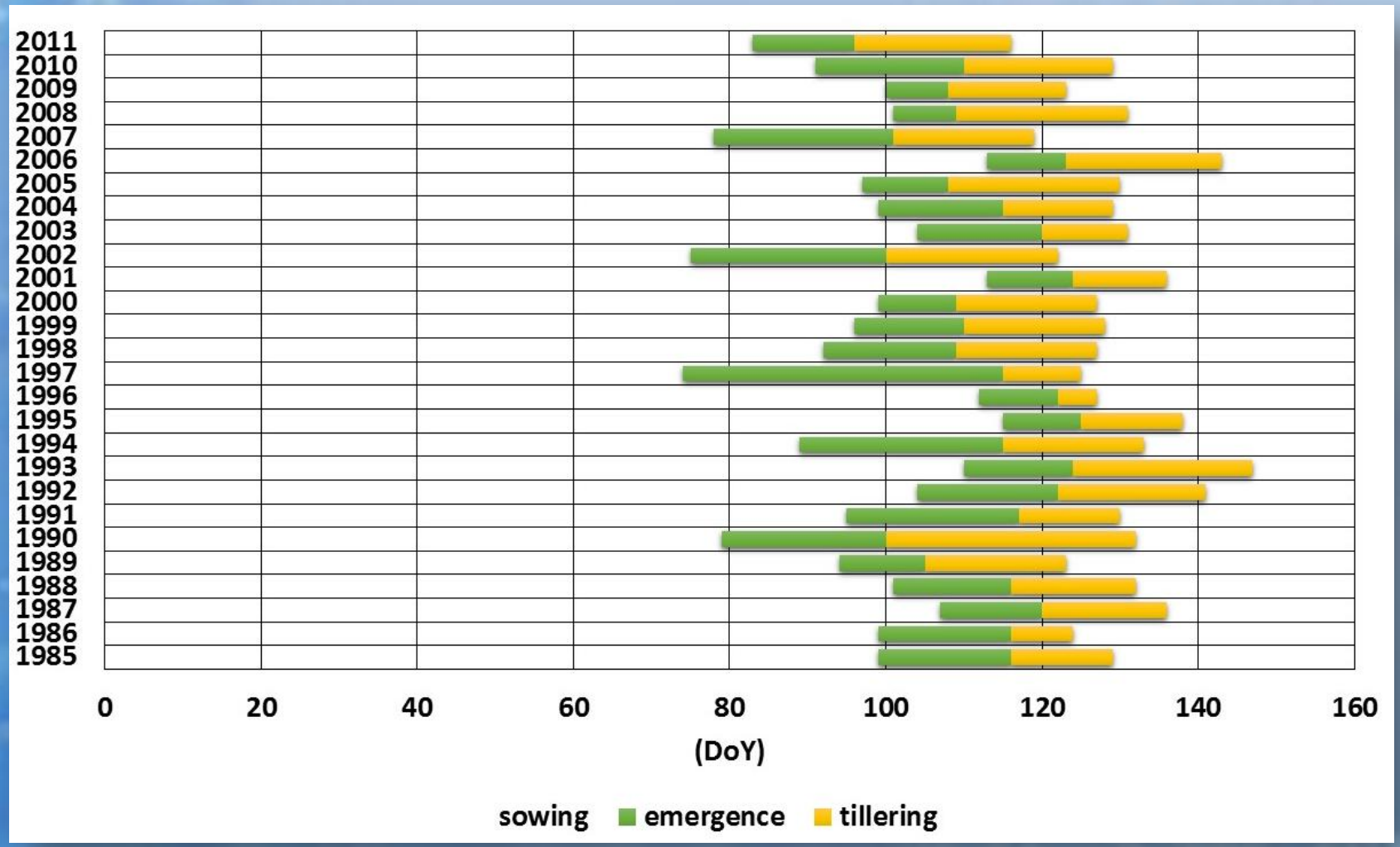
Results: phenophases Strážnice station



Results: phenophases
Pusté Jakartice station



Results: phenophases
Tis u Chotěboře station



Results: Pearson's correlation coefficient snow cover maximum and emergence

	maximum new snow cover	maximum total snow cover
Strážnice	0.126	0.046
Pusté Jakartice	0.379	0.456
Tis u Chotěboře	0.111	0.024

Results: Pearson's correlation coefficient snow cover maximum and tillering

	maximum new snow cover	maximum total snow cover
Strážnice	0.171	0.165
Pusté Jakartice	0.362	0.517
Tis u Chotěboře	0.227	0.131

Results: Monthly mean air temperature (1985–2011)

	February	March	April	May
Strážnice	0.4	4.2	9.9	14.7
Pusté Jakartice	-0.2	3.2	8.6	13.6
Tis u Chotěboře	-1.0	2.7	8.1	13.3

Results: Pearson's correlation coefficient mean air temperature and emergence

	February	March	April
Strážnice	-0.216	-0.584	-0.269
Pusté Jakartice	-0.548	-0.686	-0.046
Tis u Chotěboře	0.146	-0.197	-0.027

Results: Pearson's correlation coefficient mean air temperature and tillering

	March	April	May
Strážnice	-0.571	-0.183	-0.218
Pusté Jakartice	-0.636	-0.163	-0.128
Tis u Chotěboře	-0.429	-0.291	-0.125

Conclusion

- spring barley in the period from 1985 to 2011 - mean date
- Strážnice station: 177 m asl, 17°19‘E, 48°54‘N
  - sowing 24th March,
  - emergence 6th April
  - tillering 25th April
- Pusté Jakartice station: 275 m asl, 17°57‘E, 49°58‘N
  - sowing 31th March,
  - emergence 16th April
  - tillering 30th April
- Tis u Chotěboře station: 455 m asl, 15°30‘E, 49°42‘N
  - sowing 7th April,
  - emergence 23th April
  - tillering 10th May

Conclusion

- The highest Pearson's correlation coefficient between maximum new and total snow cover and phenophase onset are shown at Pusté Jakartice station.
- The correlation is stronger between snow cover and tillering at all stations, so it means stronger influence of snow cover on this part of barley development.

Thank you for your attention…