

## Contents

|   |           |
|---|-----------|
| <b>1. Introduction (Lenka Bartošová, Zdeněk Bauer, Jana Bauerová, Miroslav Trnka) .....</b>                       | <b>6</b>  |
| 1.1 <i>The importance of phenological observations.....</i>   | 6         |
| 1.2 <i>Determination of phenological localities .....</i>   | 6         |
| <b>1.3 <i>Geomorphological description .....</i></b>  | <b>17</b> |
| 1.4 <i>Geobotanical description .....</i>   | 19        |
| 1.5 <i>Phenological changes in flood-plain forests .....</i>  | 20        |
| 1.5.1 <i>Short-term phenological observations .....</i>   | 21        |
| 1.5.2 <i>Long-term phenological observations.....</i>   | 22        |
| <b>1.6 <i>Phenology as a component of actual science.....</i></b>   | <b>22</b> |
| <b>2. Climate characteristics (Zdeněk Žalud, Petr Štěpánek, Martin Dubrovský, Eva Nyklová).....</b>               | <b>25</b> |
| 2.1 <i>Temperature conditions.....</i>  | 26        |
| 2.2 <i>Precipitation conditions .....</i>   | 28        |
| 2.3 <i>Trends in temperature and precipitation.....</i>   | 32        |
| <b>3. Periodic flooding in flood-plain forest ecosystems (Lenka Bartošová, Zdeněk Bauer, Jana Bauerová) .....</b> | <b>34</b> |
| <b>4. Methods (Zdeněk Bauer, Jana Bauerová, Lenka Bartošová) .....</b>  | <b>38</b> |
| 4.1 <i>Methodology for observations of herb species .....</i>   | 41        |
| 4.2 <i>Methodology of the observations of shrub species .....</i>   | 43        |
| 4.3 <i>Methodology of the observations of tree species .....</i>  | 43        |
| 4.4 <i>Methodology of the observations of bird species.....</i>   | 49        |
| <b>5. Results (Zdeněk Bauer, Jana Bauerová, Lenka Bartošová).....</b>   | <b>51</b> |
| 5.1 <i>Herbs .....</i>  | 51        |
| 5.2 <i>Shrub .....</i>  | 69        |
| 5.3 <i>Trees.....</i>   | 72        |
| 5.3.1 <i>Phenological changes of trees based on meteorological parameters .....</i>                               | 72        |
| 5.3.2 <i>Phenological changes of trees based on varied altitude .....</i>   | 72        |
| <b>5.4 <i>Bird populations .....</i></b>  | <b>85</b> |

|   |            |
|---|------------|
| <i>5.5 Climate and phenology (Lenka Bartošová, Miroslav Trnka, Martin Možný, Eva Nyklová, Zdeněk Žalud)</i> .....   | 90         |
| <i>5.6 The homogeneity or heterogeneity of the phenological phases (Miroslav Trnka, Lenka Bartošová, Petr Štěpánek, Martin Dubrovský)</i> .....             | 95         |
| <b>6. Phenological response of the flood-plain forest ecosystem to changing climate (Lenka Bartošová, Miroslav Trnka, Martin Možný, Zdeněk Žalud)</b> ..... | <b>101</b> |
| <b>7. Conclusions</b> .....   | <b>109</b> |
| <b>8. Extended Czech summary</b> .....  | <b>111</b> |
| <b>9. References</b> .....  | <b>121</b> |