

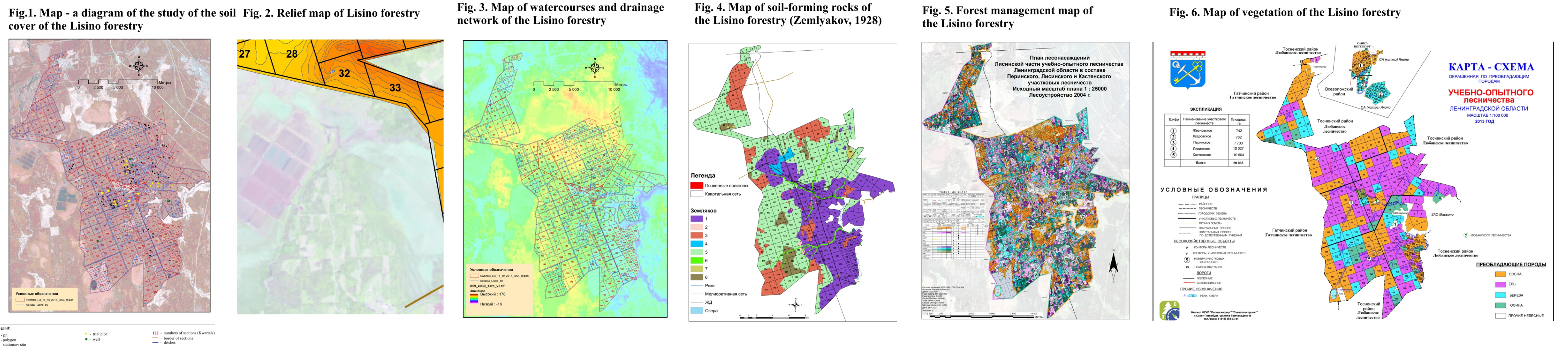
Long-term monitoring of forest ecosystems of the taiga zone of European Russia

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The aim is to study the trends and causes of changes in the soil and vegetation cover of forest ecosystems in the taiga zone over the past 200 years.

The studies were carried out 60 km from St. Petersburg in the Lisinsky educational and experimental forestry

Natural features of the Lisino forestry:



The forest area is characterized by typical for the taiga zone pine and spruce forests, as well as soils.

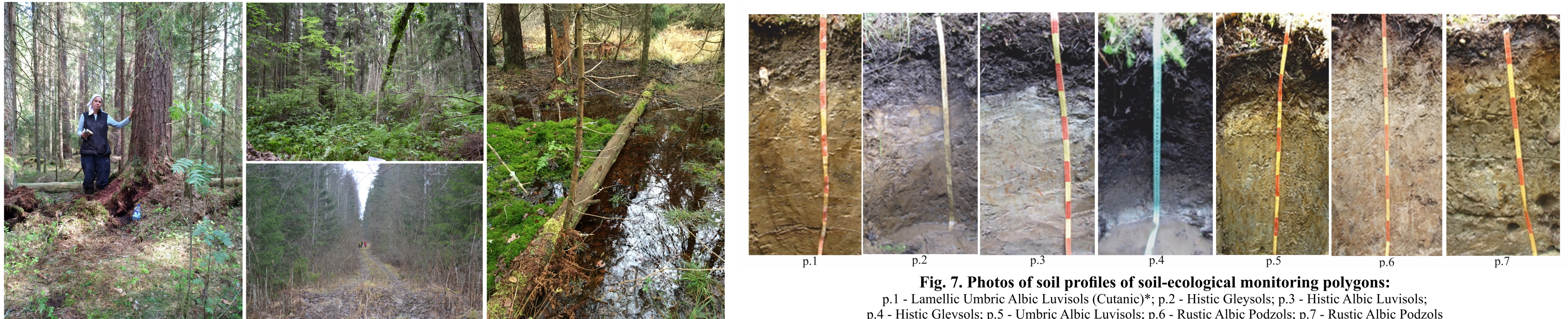


Fig. 7. Photos of soil profiles of soil-ecological monitoring polygons:
p.1 - Lamellic Umbric Albic Luvisols (Cutanic)*; p.2 - Histic Gleysols; p.3 - Histic Albic Luvisols; p.4 - Histic Gleysols; p.5 - Umbric Albic Luvisols; p.6 - Rustic Albic Podzols; p.7 - Rustic Albic Podzols

The materials of the field trip for the participants of the II International Congress of Soil Scientists (1930) formed the basis for the assessment of changes. At that time 7 soil sections under the forest vegetation of different composition, bonitet, and age were laid.

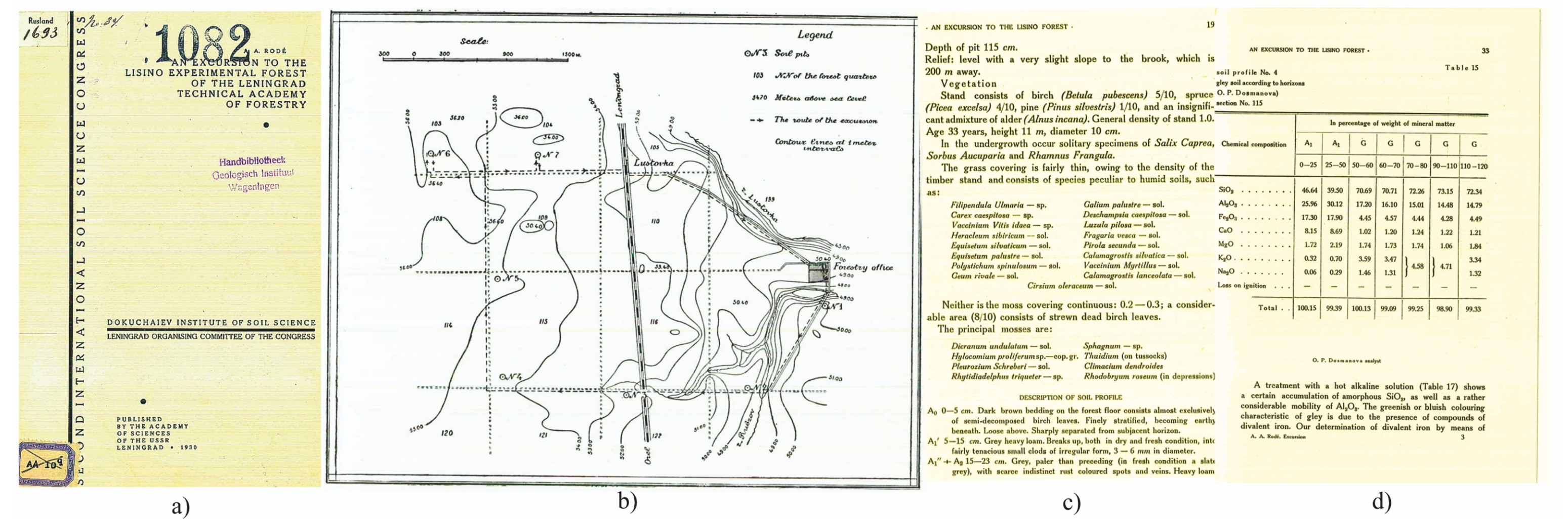


Fig. 8. The materials of the field trip for the participants of the II International Soil Science Congress (1930):
a - the cover of the Guide; b - the map of the excursion route; c - the example of vegetation and soil (fragment) description and d - chemical soil characteristics

Polygon №3

122nd section of the forestry: 1) N59°24'23,4'' E30°39'36,5''; 2) N59°24'24,37'' E30°39'42,16''; 3) N59°24'17,42'' E30°39'41,29''; 4) N59°24'20,94'' E30°39'47,2''

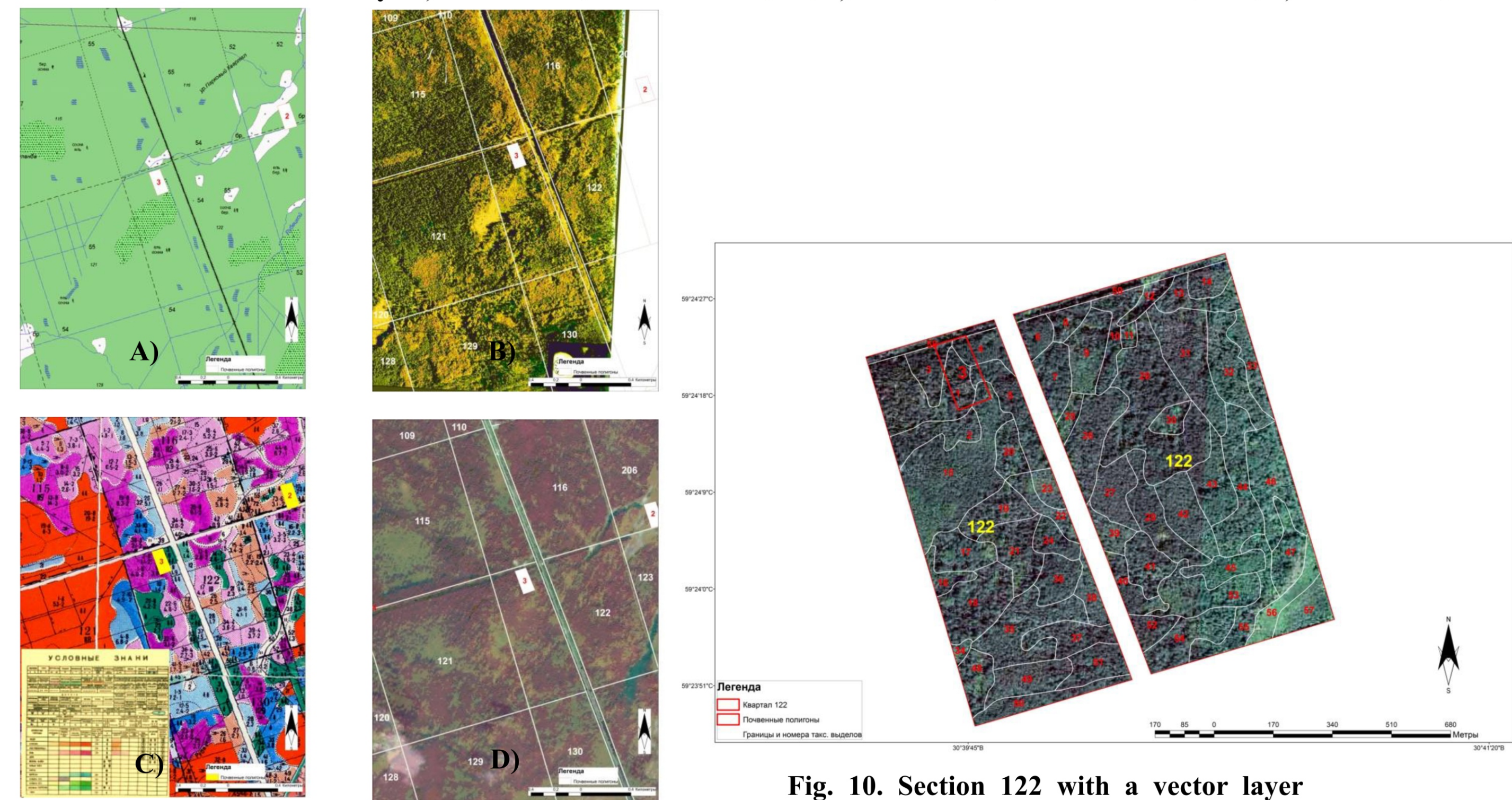


Fig. 9. Spatial location of soil polygon №3 on:
A - topographic map M1: 25000; B - color spectrozonal aerial photograph M1: 12000; C - plan of afforestation M1: 25000; D - satellite image from the Sentinel-2 satellite

Fig. 10. Section 122 with a vector layer of taxation allotments and soil polygon №3

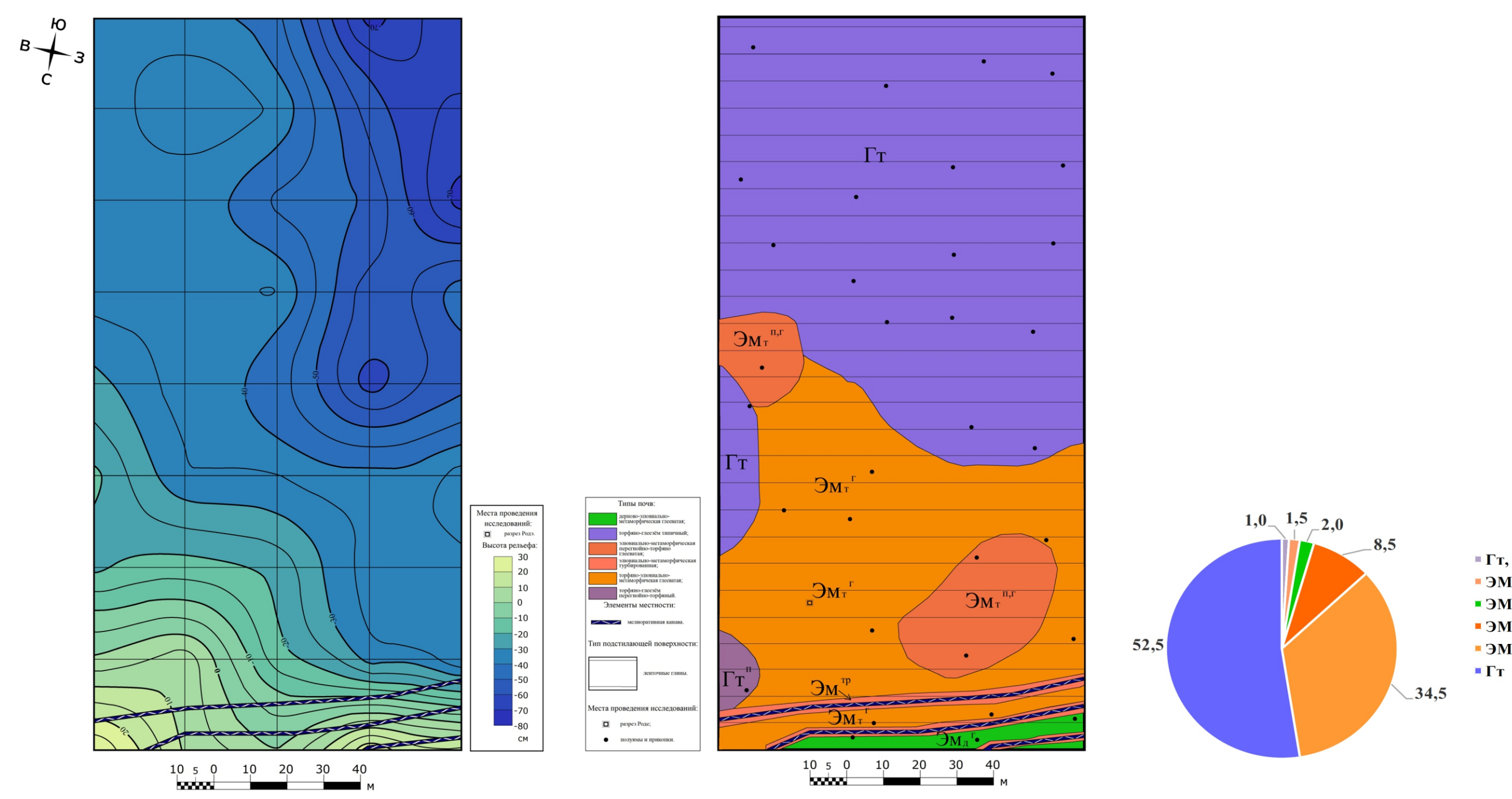


Fig. 12. Topographic map of Polygon №3

Fig. 13. A - soil map; B - component composition of soils

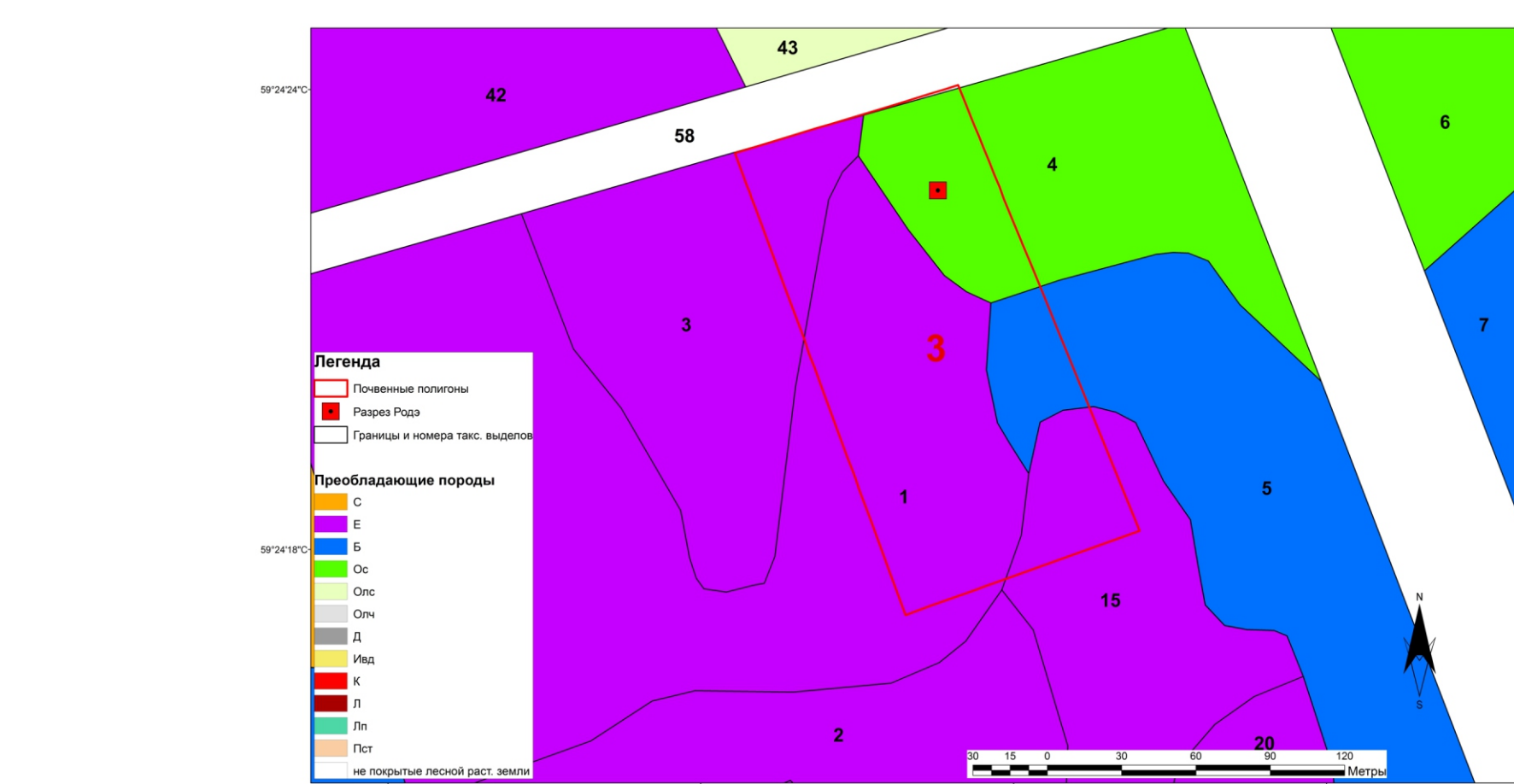


Fig. 11. Polygon №3 with a vector layer and numbers of taxation units
Branch number 1: The composition of the stand: 6E3S1B; Prevailing breed age: 160 years; Prevailing breed height: 28 m; Prevailing breed diameter: 32 cm; Relative fullness: 0.7; Stock per hectare: 389 m³; Bonitet class: II; Forest type: oxalis; Teenager: 10E; 40 years; Height 5 m; 2 thousand pcs / ha.
Branch number 4: The composition of the stand of the 1st tier: 8O2C + B; Prevailing breed age: 70 years; Prevailing breed height: 32 m; Prevailing breed diameter: 32 cm; Relative completeness: 0.8; Stock per hectare: 381 m³; Second tier tree stand: 10E; Prevailing breed age: 50 years old; Prevailing breed height: 14 m; Prevailing breed diameter: 12 cm; Stock per hectare: 64 m³; Bonitet class: I; Forest type: oxalis.

Conclusion: Eighty years later, new pits were laid in Congress places and a descriptions of the vegetation cover was made.

Polygons with an area of 2 ha were allocated around the investigated sections in order to conduct soil-vegetation monitoring. Large-scale soil and relief maps (Scale 1: 500) were created, and the vegetation cover was described.

The availability of initial information on the state of forest ecosystems at the beginning of the XIX century and the study records of 1930 and 2012 provided an opportunity to identify trends in the development of the soil-forming process.

Analysis of meteorological data over a 150-year period showed that air temperature and precipitation fluctuated within the climatic norm during this period. Soil changes are associated with drainage reclamation and vegetation succession.

Substantiation was provided for the designation of the Lisino Biosphere Polygon for monitoring forest ecosystems of the taiga zone.