Impact of granulated liming fertilizer to soil plant available P content

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Introduction and background

- Approximately 55% of Estonian agriculturally used lands are in need of liming
- The optimum pH range for plants is 6,0 – 7,2
- For liming were used in Estonia:
  a. natural $CaCO_3$ containing materials – limestones
  b. ashes of power plants – oil-shale ash and wood ash
  c. biochar – only in experiments at moment

Introduction and background

- The use of powdered ashes for fertilizing is technically complicated (dust, sintering)
- The ashes in granulated forms are more user-friendly to use (no dust, no sintering during storage)

Material and methods

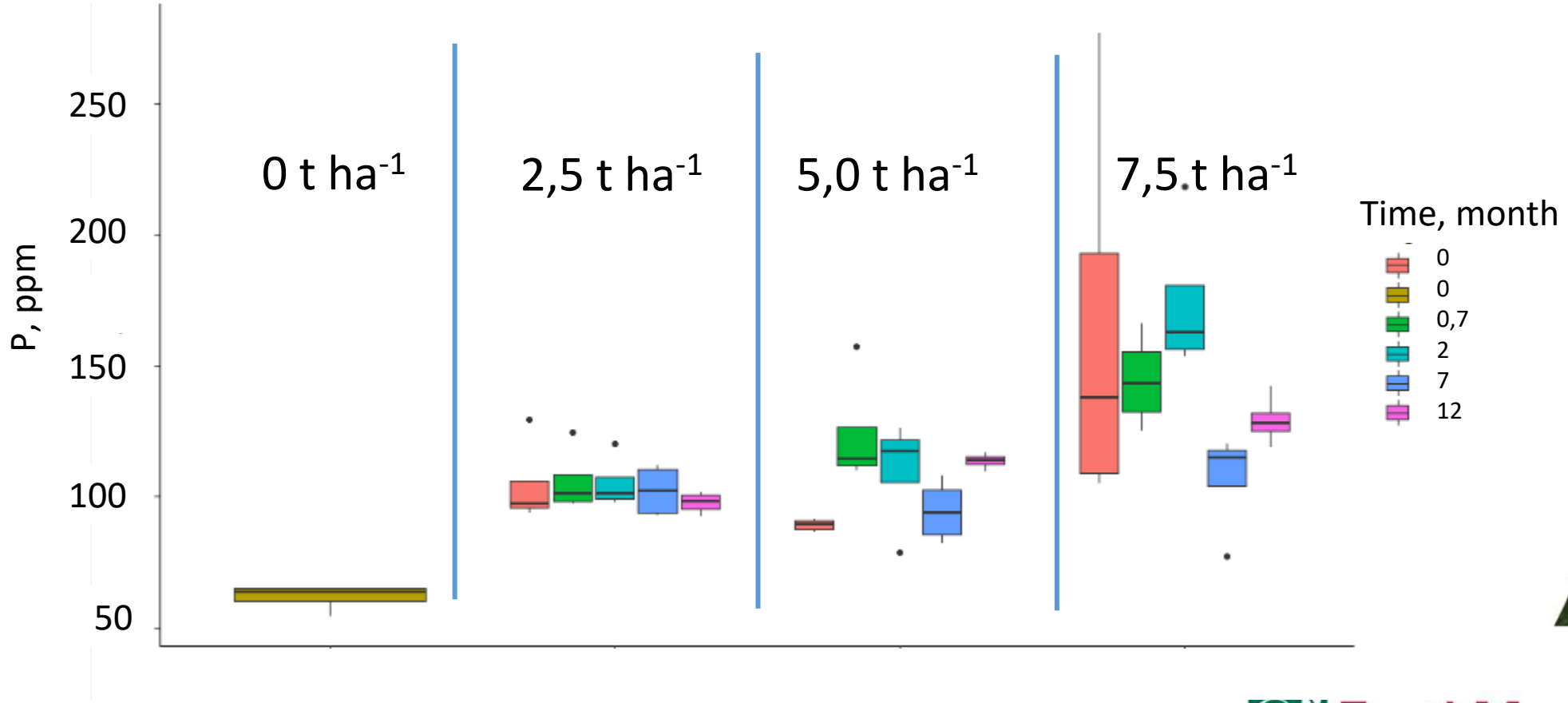
- Pot experiment
- For liming were used
  a. Granulated oil-shale ash
  b. Granulated wood ash
  c. Granulated biochar
- Three different doses were used: **2,5** g, **5,0** g and **7,5** g fertilizer per 1 kg soil

  This norms are equal to **2,5**, **5,0** and **7,5** t ha^{-1} on the field

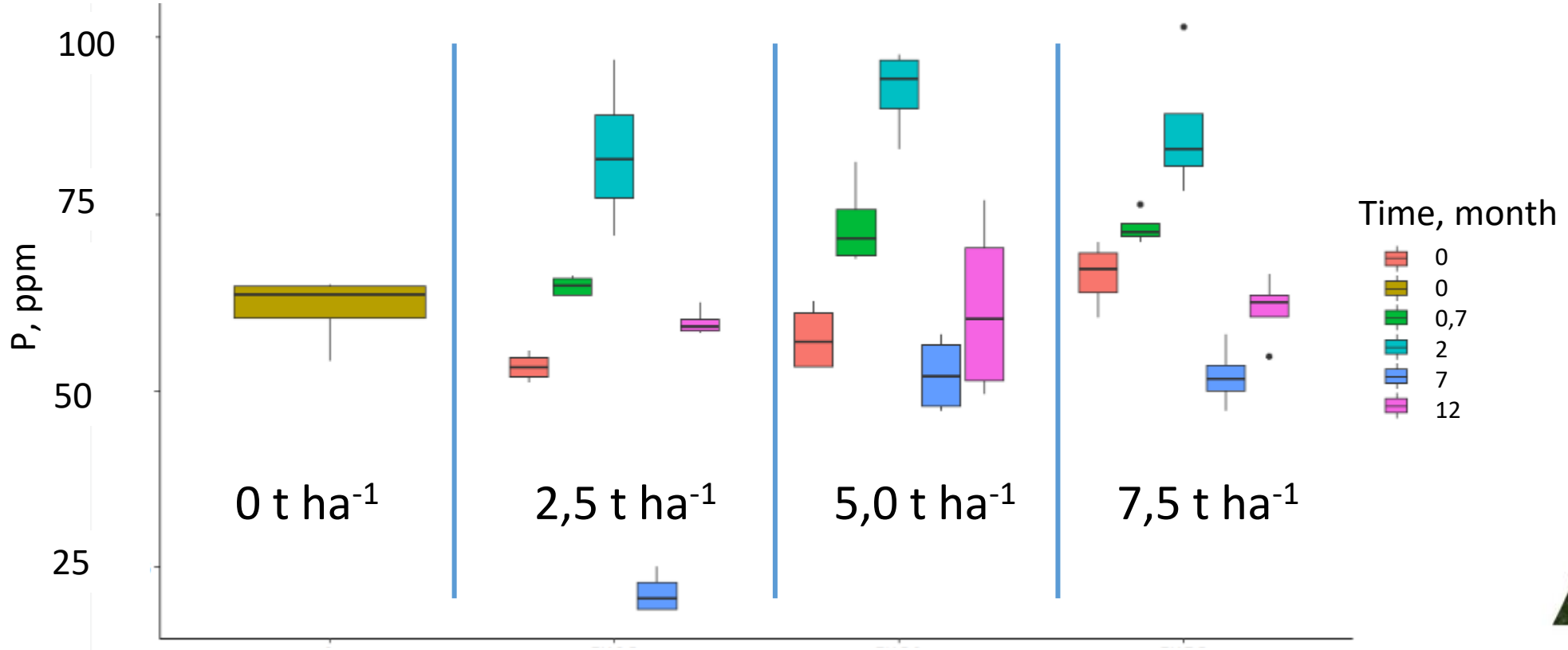
Material and methods

- The granulated fertilizer was mixed with soil
- 4 parallels were used in experiment
- The duration of incubation experiment was 12 month. During the experiment the soil was kept wet.
- The sampling of soil was provided after 20 day, on the 2nd, 7th and 12th month
- The content of plant available phosphorus was determined by AL (Egner -Riehm –Domingo) method from sampled soils

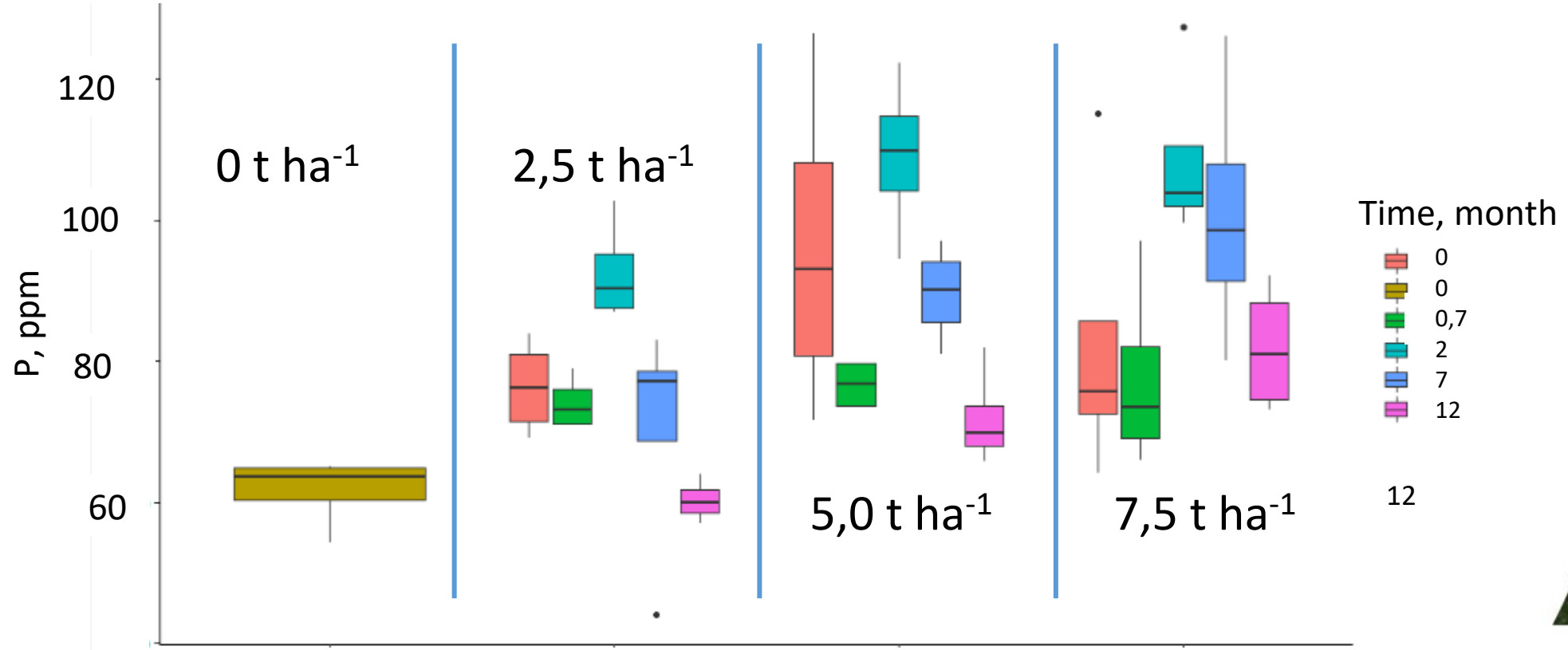
Effect of different doses of wood ash on soil P content



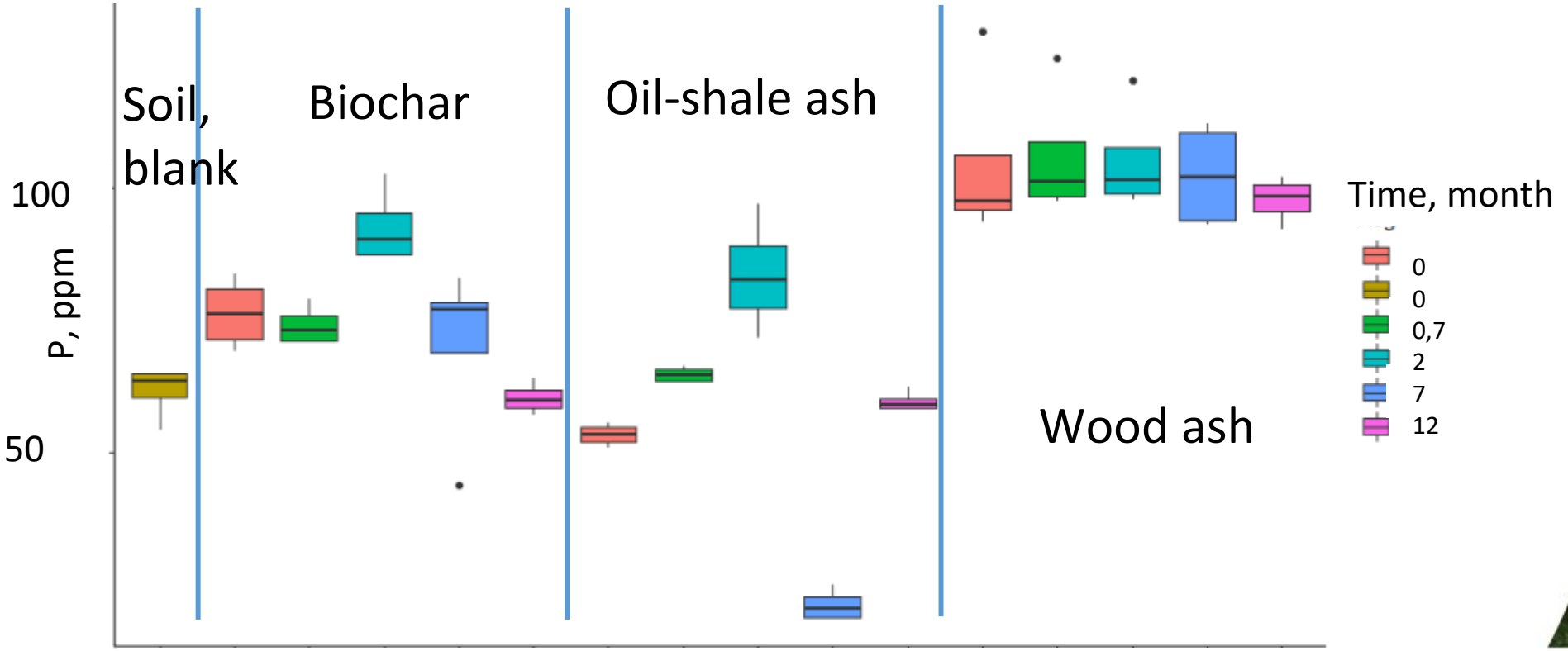
Effect of different doses of oil-shale ash on soil P content



Effect of different doses of biochar on soil P content



Effect of liming fertilizers at dose 2,5 t ha^{-1}



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Conclusions

- The granulated biochar and wood ash can be used simultaneously as for liming and as phosphorus fertilizers
- The most effective for rising soil P content with liming was granulated wood ash at dose 7,5 t ha^{-1}
- The liming with oil-shale ash may cause a decrease in soil plant-available phosphorus content

Thank You for your attention!