

Table 1 – Content of mobile phosphorus in chestnut soil types on pastures in Western Kazakhstan depending on the grazing technology, in the soil layer of 0-30 cm

| Grazing technology | 1 zone Dark chestnut soils | | 2 zone Chestnut soils | | 3 zone Light chestnut soils | |
|--------------------|------------------------------------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|--------------------------------|
| | Mobile phosphorus content, mg/100g | Differ from reference, mg/100g | Mobile phosphorus content, mg/100g | Differ from reference, mg/100g | Mobile phosphorus content, mg/100g | Differ from reference, mg/100g |
| Absence of grazing | 2.00 ± 0.047 | - | 1.54 ± 0.023 | - | 1.05 ± 0.008 | - |
| Weak grazing | 1.77 ± 0.016 | -0.23 | 1.11 ± 0.015 | -0.43 | 0.95 ± 0.009 | -0.10 |
| Moderate grazing | 1.60 ± 0.018 | -0.40 | 0.94 ± 0.009 | -0.60 | 0.87 ± 0.093 | -0.18 |
| Intensive grazing | 1.41 ± 0.030 | -0.59 | 0.85 ± 0.007 | -0.69 | 0.64 ± 0.004 | -0.41 |

On dark chestnut soils of zone 1 the difference in median value of mobile phosphorus at technology of weak grazing, in comparison with technology of grazing absence makes - 0.24 mg/100g, at technology of moderate grazing the difference makes - 0.41 mg/100g, and at intensive grazing - 0.61 mg/100g.

For the chestnut soils of zone 2, the difference of mobile phosphorus content in median value for the technology of grazing absence, at weak grazing technology was - 0.45 mg/100g, at technology of moderate grazing - 0.61 mg/100g, and at intensive grazing technology - 0.69 mg/100g.

For light chestnut soils of zone 3, the response to grazing technology was accordingly: weak grazing 0.1 mg/100g; intensive grazing - 0.41 mg/100g. According to significance level of *p*, the moderate grazing technology in this sampling does not cause a significant response for quantitative factor of mobile phosphorus content (*F*, mg/100g).

Thus, it was established that the content of mobile phosphorus increases with the increase in intensity of grazing on all types of soils except for the technology of moderate grazing in zone 3 of light chestnut soils.

Deterioration of physical and chemical properties in turn leads to an increase in the content of sodium exchange in soil, which is an indicator of salinity and increase in the process of alkalization of soils [4,19,20]. On chestnut soils of pastures in zone 2 the content of sodium exchange, depending on grazing technology, has increased in comparison with control (reference) value from 0.08 to 0.32 m-equiv./100 g (figure 2).

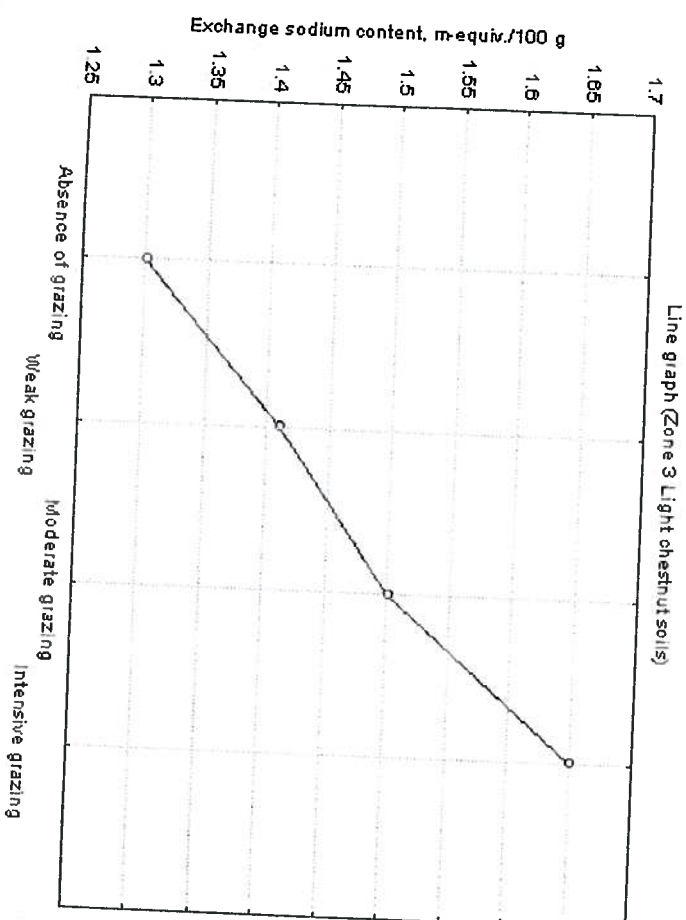
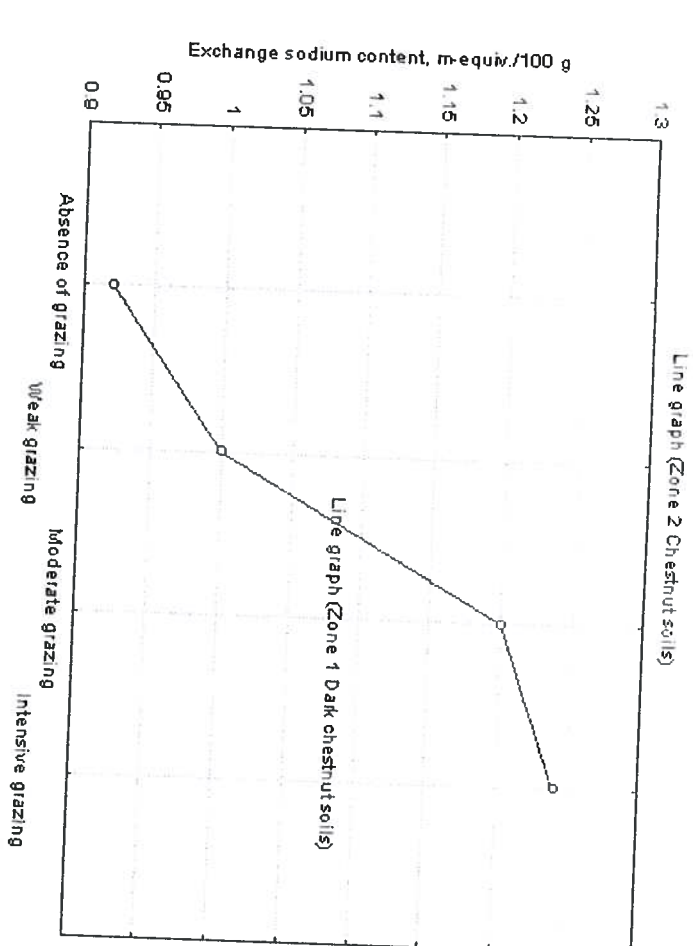
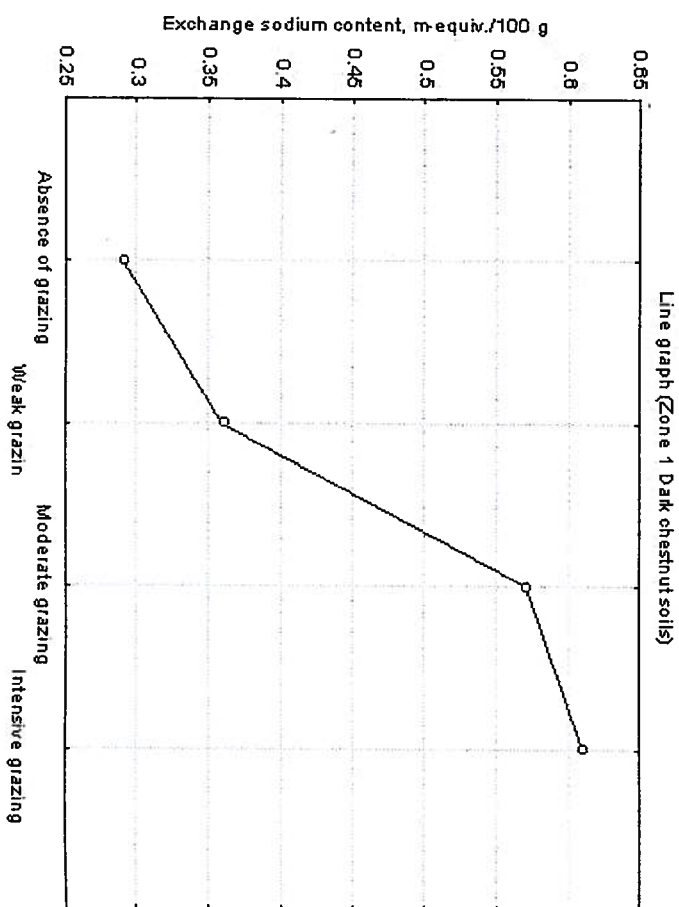


Figure 2 – Dynamics of exchange sodium content in chestnut soils depending on grazing technology, m-equiv./100 g

In pasture soils the content of sodium exchange rate ranges from 4.98 to 5.92% of the sum of exchange bases, which corresponds to the degree of weak salinity. In light chestnut soils of zone 3 with the sum of exchange bases at 15.10-15.65 m-equiv./100g the content of sodium exchange rate was 1.41-1.65 m-equiv./100 g or 9.33-10.54% of exchange capacity. The pasture soils of weak and moderate grazing in terms of sodium exchange rate belong to weak saline soils, and for intensive grazing - to medium saline soils.