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THE EFFECT OF MANURE AND MINERAL FERTILIZER RATES ON ZINC DISTRIBUTION IN THE SYSTEM «SODDY-PODZOLIC SOIL – WINTER RYE PLANT»

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In a long-term field experiment it was established that the systematic application of manures led to a significant increase in the content of gross and mobile compounds of zinc in the light loamy soddy-podzolic soil. The content of mobile Zn in the soil was closely correlated with the organic matter content (r = 0,956). In descending zinc content, the plant organs of winter rye could be arranged in a row: grain ≥ roots > chaff > straw. The zinc content in grain, chaff and straw of winter rye linearly decreased with an increase in the contents of exchangeable calcium and magnesium in the soil. It was revealed that competitive interactions of Mg-Zn in the soil-plant system were more intense than the interaction of Ca-Zn: the correlation coefficients characterizing the dependence of zinc content in grain, chaff and straw of winter rye plants from the content of exchange Mg in soil were –0.814; –0.933 and –0.767, respectively. It was established that the coefficients of zinc accumulation by winter rye plants decreased linearly with increasing content of soil organic matter, amount of exchangeable calcium and magnesium in the soil and soil pH. The close interrelations of zinc distribution between the aboveground organs of winter rye plants were revealed: the correlation coefficients characterizing the dependence of content Zn (grain) – Zn (straw), Zn (grain) – Zn (chaff) and Zn (straw) – Zn (chaff) were 0.953; 0.913 and 0.913, respectively.

Key words: soddy-podzolic soil, manure, fertilizer, zinc, winter rye, accumulation factors.