**????????**

????? XIX – ?????? XXI ???? ??????? ? ?????? ????????? ????????? ?? ????? ??????? [1]. ?????????????? ????????? ??????? ? ??????? ????????? ??????????? ? ????????? ????????? ??????? ? ???????? ??????????? ??????????? ? ???? ???????????? ???????? ?????? ??????????? ??? ? ????????? ? ???????? ??????????. ????????? ?????? [2] ??????? ??????????? ??????????? ?????? ????????? ???????????? ??? ????? ? ???????? ?????? ?????????????.

????????, ??? ??????????? ????????? ?? ????????? ? ??????????????? ? ??????? ?? ??????? ??????????? ????? ????????? ? ???????? ????? ??????? ??????? ????????, ????????????, ????????????? ? ????????????? ??????????? [3]. ????? ????, ??????? ?? ????? ??????????? ? ????????????? ????????? ????? ????????? ? ??????? ????????? ? ?????? ????????? ??????? ??????? ?????. ?????? ????????? ? ?????? ???????? ? ??? ???????????? ???, ????? ??? ? ???????? ????????? ?? ????????????? ????????, ??????????? ?? ??????????? ????????? ?? ??????????? ????????, ? ????????????? ? ???? ? ????? ??? ??? ??????????????? ????????, ????????? ?? ????????? ??? ??????????? ? ???????? ???????? ? ??? ??? ???? ??????? ??-???????. ?????? ??????? ???????? ???????? ??????????? ? ??????????? ?????? ???????? ????? ??????????? ? ????????????? ?????? ????????? ?? ????????? ??????? ?? ??? ??? ???????? ?? ?????????.

**????? ????????? ????????**

????????, ??? ??? ???????? ??????? ???????? ????????? ? ??????? ????????????? ??????? ??????????? ?? ?????? ???????? ?????? ????????, ?????????????? ?? ?????? ?????? ??????? ????????? ????????? ?????? ??????????? ??????????? ???? [5]. ???????? ?????? ????????? ? ??????? ? ???????????????? ????????? ????? ??????? ?? ???? ??????????? ?? ????????, ?????, ????????, ? ???????????? ???????? ?, ??? ???????, ????????????? ?? ?????? ?? ????????? ?????? – ????? ?????? ? ??????? ????????? [5, 6]. ? ????? ? ????????? ????????? ???????? ????? ?? ?????? ??????? ?? ????????????? ???????? ??????, ??? ?????????? ????????, ????????? ??????? ?????????????????, ??????????? ?? ????????? ? ?????? ????????? ? ???????????? ?????, ??????? ???????, ??????? ? ???????? ??????? ? ??????? ??????? (?????, ????, ?????) ????????????? ??????? ???? ??? ????? ??????????? ???? ? ?????? ????????. ????? ???????, ?????? ???????? ?????? ????????? ????? ? ?? ???????????? ????????? ???????? ???????? ????????? ????????? ???????????? ? ??????? ??????? ?? ???? ???????? ? ?????????? ? ??????? ???????? ???????? [1, 4]. ??????? ????????? ???????? ? ?????????? ???????? ???????? ????? ??????????? ?????? ????????????? ????????, ????????? ?? ????? ???????? ????????????? ?????? ???????, ????????? ??? ??????????? ????. ?.?. ???????? ? 1959 ?., ?? ????????? ??????? ?? ??? ??? ???????? ?? ?????????. ? ????? ? ???? ?? ????????? ? ?????? ???????? ????? ???????????.

? ???? ??????? ????????? ??????????, ??? ??????????? ????? ?????????????????????? ??????????? ???? ????????? ???????? ????????? ?????? ??????????? ???? ?? ????????, ???????????? ???????? ? ????????, ??????? ??????????? ???? ??? ?????? ??????? [1, 7]. ??? ??????? ?????? ????????? ???????? ???????????? ????????? ??????????? ????? ??????? ????? [8] ? ?? ????????????? ? ?????? ????????, ? ????? ???????? ????? ???????????? ??????-, ??????- ? ??????????????????? ?????? ????????? ? ??????????? ????? ????????? ?????? ??????? ??????????????????? ???????? [9, 10]. ????????? ?????? ???????? ?????????? ????????????? ?????????? ?????? ????????, ????????, ?????? ????????? ? ????????? ????????? ???????????????? ????? ? ????????? ??????? ???????? ????????? [11]. ??? ????????? ???????? ????????? ?????????? ????????? ?????? ?????????, ??????? ?? ?? ???? ??????????? ?????????? ????????? ????? ? ????????????? ?????? ????????? [12]. ? ????????? ??????? [13, 14] ?????????? ??????? ???????????? ???????? ?????, ??????????? ? ???????? ??????????? ? ??? ???????????????, ??????????, ??????????? ? ????????????? ????????? ? ????????????? ??????? ??????????????????? ? ?????????????? ??????? ?????? ? ????????? ???????? ?????. ????????? ????? ? ????????? ????? ????????? ????????? ??????? ?????????????? ????????? ???????, ? ????????, ?????????????????? ? ???????? ??????, ???? ????????? ?????????? ????????? ?????? ??????? ?? ???????? ??? ????????? ????? ???? ? ?????????? ??????. ????? ???????, ????? ????????? ??????? ????? ????????? ?????????? ?????? ??? ????????? ? ????????? ????????? ???????? ???????. ???? ? ? ??????? ??????? ????????? ??????? ?? ??????? ???????????? ??????? ????????? ??? [15]. ?????? ?????????????????? ?????? ? ?????? ???????? ?????????????????? ??????? ???????? ??????????? ?????? ????? ??????? ????????? ?????? ???? ?????? ?????????. ??????? ???????, ??? ?? ??????????????????? ??????? 10-15 ?? ???????, ?????? ???????? ? ??? ?? ??????? ?????, ?? ???? ? ?? ??, ??? 10-15 ?? ???????, ????????? ? ??????? ?? ????? ?????. ?? ???? ??? ?????? ????????? ???????? ?????????? ??????? ?? ??????????????????? ?????? ?????? ??????. ??????? ????????? ????????? ??????? ?????? ?????????????? ???? ?????? ? ?????? ???????? ?????????????? ???????, ????? ?????????? ???? ?????? ????????, ? ?? ?? ?????? ??? ????????. ?????????????, ????? ????????? ?? ?????? ????????? ????????? ???????, ?? ? ?????? ???????. ???? ? ???, ??? ???????? ??????? ? ????? ???????????????? ? ??????????? ?????????????????? ? ??????? 40-???????????????? ???? ?????, ?? ?????????????? ????-???? ??????? ? ???????? ?????????????? ?????, ?????????????????? ?????? ?? 1,0-1,5 ?. ?????? ??? ???????? ??????? ?????????????? ?????? ??? ?????????????? ????? (??????? 1).

??????? 1 – ???????????????? ????????
??????? ????? ??????????????? ?? ?????????????
?????? ? ???? ???? ?????? ?????? ($?_2$), ??????????????
? ?????????

Figure 1 – The surface root system of Scots pine on sandy loamy soils in the forest type fresh subor (B2), leading to a windblow.

????????: ??????????? ?????????? ??????? Source: author’s composition

?????? ????? ?? ????????? ???????? ?????? ? ????? ?????? ?????????????? ????? ????? ????????? ????? ? ????????? ??????. ??????? ???? ? ????????? 1-2-????????? ??????? ??????? ??????? ????? ?? ??????? ? ???? ?? ??????????, ?? ????? ??????????? ????? ??????? ??????????? ? ?????? ? ??????? ??????? ????????. ?????? ??????????????? ?????? ??????? ? ??? ??????????? ????????, ???????? ?????, ??????? ?????????? ? ????????? ????????? ??????? ? ???????? ?????? ?????????? ???? ?? ???? ?????? ?????? ?????? ?????????? ??????????????? ? ????????? ??????? ??????, ??????? ? ???? ?????? ????????, ? ? ???????-???????? ? ??????? ????????. ??? ????? ?????? ? ?????? ????????? ??? ????????? ?? ???????? ? ????????? ??????-?????? ???? ? ???? ??????????? ????????? ??????? ? ????? ??????, ???????????? ???????? ??????? ????????? ? ????????? ??? ??????????????? ????????. ???????? ? ??????????? ?????? ?????? ?? ??????? ??????? ??????????? ???????? ?????, ????? ?? ??? ?????? ????? ????? ?? ???? ???????, ? ?? ????????? ????? – ????? ?????? ???????? ???? (??????? 2-5).

## ??????? 2 – ???? ????? ??????? ? ???????? ?????

Figure 2 – Growth of new shoots in pine trees

????????: ??????????? ?????????? ??????? Source: author’s composition

## ??????? 3 – ???????? ? ???????? ?????

Figure 3 – Flowering in pine trees

????????: ??????????? ?????????? ??????? Source: author’s composition

??????? 4 – ???????? ?? ??????? ???????? ?????

??????????? ??????? ???????? (1) ? ???????? ???? (2)

Figure 4 – Development of generative organs on pine tree shoots of the current (1) and last year (2)

????????: ??????????? ?????????? ???????

Source: author’s composition

??????? 5 – ???? ? ???????? ?? ??????? ???????? ????? ??????????? ??????? ???????? (1),

???????? (2) ? ??????????? (3) ????

Figure 5 – Growth and development on the shoots of pine trees of the generative organs of the current (1), last (2) and the year before (3) last

????????: ??????????? ?????????? ??????? Source: author’s composition

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???????? ????, ? ????? ?? ?????? ?????? ???????? ???????????? ? ????????????? ? ????????? ???????? ??????