. .   , . . .,, . .   , . .‾. ., . .   , . .‾. .,,

( ),   -
,   – (ai/bj,   ).

.
.   ,
,   ,   ,   .

[1,2].   -
,   ( )
,   . .   [3].   ( ).
-
.
,
[4-6].
.
-
1993-   0,01   ( ),   (30%).
1995   .
.
(0-20   )
- ;   :
,   -   =   2 5( )   (N   (2 5( )   N/N 4
«   »   -   N/N 3   2 ( ))),
( )   –
1; 5; 10   [7].   ; ,   2 5( ),N, , ,   2 5 ( ), N/N 4, ,
N/N 3, 2 –
0,5 % [8].   .
,   43,5 %,
1   77,8%.
.
((λ = 1,55 < 1,63).
.   ,
(-   .   (,
)   4   : 1)   ,   ),
15 % –   ; 2) 15-40 % –   .
; 3) 40-60 % –   ; 4)   60 % –
.
.   (.2).   ,
.
-   .
[9].   ,
.
(,   ),

1.			
		(	)
		%	
- ( ), =0,1089 =0,2140	< 30	> 60	4
	30-40	40 ÷ > 60	3 – 4
	40 – 50	< 15 ÷ 40	1 – 2
	50 – 60	< 5 ÷ 40	1 – 2
	> 60	< 15	1
, ( ) % =0,1970 =0,3578	< 2	40 ÷ > 60	3 – 4
	2 – 3	40 ÷ > 60	3 – 4
	3 – 4	< 15 ÷ 40	1 – 2
	> 4	< 15 ÷ 40	1 – 2
2 5( ), /100 =0,0542 =0,3369	< 20	40 ÷ > 60	3 – 4
	20 – 30	> 60	4
	30 – 40	<15 ÷ 40	1 – 2
	> 40	<15	1
2 5( ), /100 =0,0922 =0,1555	< 1	40 ÷ >60	3 – 4
	1 – 2	<15	1
	2 – 3	<15 ÷ 40	1 – 2
	> 3	15 ÷ 40	2
, % =0,1181 =0,2173	< 0,20	> 60	4
	0,20 -0,25	15 ÷ 40	2
	0,25 – 0,30	<15	1
	> 0,30	15 ÷ 60	2 – 3
K_2O( ), /100 =0,0542 =0,959	< 20	>60	4
	20 – 30	< 15 ÷ 40	1 – 2
	30 – 40	< 15 ÷ 40	1 – 2
	> 40	15 ÷ 60	2 – 3
N/NO_3, / =0,0737 =0,1598	< 5	40 ÷ > 60	3 – 4
	5 – 10	< 15	1
	10 – 15	< 15 ÷ 40	1 – 2
	15 – 20	40 ÷ 60	3
	> 20	15 ÷ 40	2
N/N_4, / =0,0786 =0,1917	< 10	> 60	4
	10 – 15	40 ÷ > 60	3 – 4
	15 – 20	15 ÷ 40	2
	20 – 30	40 ÷ 60	3
	> 30	< 15 ÷ 40	1 – 2
N, % =0,1095 =0,2175	< 0,20	40 ÷ > 60	3 – 4
	0,20 -0,25	< 15	1
	0,25 – 0,30	15 ÷ 40	2
	> 0,30	40 ÷ 60	3
, % =0,0740 =0,1347	< 30	> 60	4
	30 – 35	< 15	1
	35 – 40	15 ÷ 60	2 – 3
	> 40	15 ÷ 60	2 – 3

(. 3). (5–10 /) .

2.				-
		%		%
		<15-40	1-2	<15-40	1-2
		>60	4	40->60	3-4

3.			
	(		)
%		/	
<15	1	>10	3
15-40	2	>10	3
40-60	3	5-10	2
>60	4	<5	1

5 10 , – 5 , – 1 5 . ( ), , ( ).

1. . ., . . // . – ., 1978. – .94-104. 2. . ., . ., . – .: , 1984. – 287 . 3. . – .: - ,1971. – 140 . 4. . ., . ., ., // .- 1980. – .49.- 1.- .143-140. 5. . ., . ., . . . // . – .: - ,1989.- .5-46. 6. . . . – .: - , 1987. – 256 . 7. . ., . ., , 1991.- 303 . 8. : / . . . .- .: , 1991. – 304 . 9. . ., . . // . . . . – .: ,1969. – .3. – .5-71.

Formation factors of microbial toxicosis in steppe chernozems of Altai krai
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Summary. The low yield of wheat can be related to the phytotoxicity of soil, which depends on the contamination with heavy metals and the osmotic pressure of soil solution.
Key words: soil phytotoxicity, chernozem, heavy metals, wheat yield, crop rotation.