

**Figure S1.** Growth of PGPB studied on LB medium with different concentrations of Ni<sup>2+</sup>. Notes: different letters (a–e) are significantly different at the  $p \leq 0.05$ , as determined by Duncan's multiple range test. AFI1: *Bacillus megaterium* AFI1, AFI2: *Paenibacillus nicotianae* AFI2.

**Table S1.** The effect of Ni and PGPB *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae*. AFI2 on the area of flag leaf of wheat cv. Leningradsкая 6.

Variant	Flag leaf length, cm	Flag leaf width, cm	Flag leaf area, cm <sup>2</sup>
Control	19.6±1.5 <sup>bc</sup>	0.68±0.03 <sup>b</sup>	8.9±0.4 <sup>b</sup>
AFI1	22.1±1.3 <sup>ab</sup>	0.76±0.04 <sup>a</sup>	11.2±0.4 <sup>a</sup>
AFI2	22.6±1.1 <sup>a</sup>	0.81±0.07 <sup>a</sup>	12.2±0.7 <sup>a</sup>
AFI1+AFI2	22.7±1.4 <sup>a</sup>	0.77±0.05 <sup>a</sup>	11.7±0.5 <sup>a</sup>
Ni	17.9±1.3 <sup>c</sup>	0.61±0.03 <sup>c</sup>	7.3±0.4 <sup>c</sup>
Ni+AFI1	20.0±0.9 <sup>bc</sup>	0.68±0.04 <sup>b</sup>	9.1±0.4 <sup>b</sup>
Ni+AFI2	20.7±1.4 <sup>ab</sup>	0.62±0.03 <sup>bc</sup>	8.6±0.6 <sup>b</sup>
Ni+AFI1+AFI2	20.3±1.1 <sup>ab</sup>	0.67±0.05 <sup>b</sup>	9.1±0.5 <sup>b</sup>

Notes: Control: non-inoculated wheat plants. Ni: the addition of 100 mg/kg Ni<sup>2+</sup>. AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae* AFI2. Bars show ±SEM. Values in columns followed by different letters (a–c) are significantly different at the  $p \leq 0.05$ , as determined by Duncan's multiple range test.

**Table S2.** The coefficients of Ni biological accumulation (CBA) and Ni translocation (CT) in wheat grains.

Variant	Ni	Ni+AFI1	Ni+AFI2	Ni+AFI1+AFI2
CBA, 1 <sup>st</sup> year	0.166±0.009 <sup>a</sup>	0.111±0.006 <sup>c</sup>	0.129±0.007 <sup>b</sup>	0.127±0.007 <sup>b</sup>
CBA2, 2 <sup>nd</sup> year	0.180±0.010 <sup>a</sup>	0.121±0.007 <sup>c</sup>	0.139±0.008 <sup>b</sup>	0.135±0.008 <sup>b</sup>
CBA average	0.173±0.009 <sup>a</sup>	0.116±0.006 <sup>c</sup>	0.134±0.006 <sup>b</sup>	0.131±0.006 <sup>b</sup>
CT, 1 <sup>st</sup> year	0.098±0.006 <sup>a</sup>	0.073±0.004 <sup>c</sup>	0.083±0.005 <sup>b</sup>	0.083±0.005 <sup>b</sup>
CT 2 <sup>nd</sup> year	0.101±0.006 <sup>a</sup>	0.075±0.004 <sup>bc</sup>	0.084±0.005 <sup>b</sup>	0.084±0.005 <sup>b</sup>
CBA average	0.099±0.004 <sup>a</sup>	0.074±0.003 <sup>c</sup>	0.084±0.003 <sup>b</sup>	0.083±0.003 <sup>b</sup>

Notes: Ni: non-inoculated wheat plants, growing under Ni stress (100 mg Ni<sup>2+</sup> per 1 kg of soil). AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae* AFI2. CBA= Ni concentration in the grains/Ni concentration in the soil, CT= Ni concentration in the grains/Ni concentration in the roots. Bars with different letters in the rows are significantly different at  $p \leq 0.05$ , as determined by Duncan's multiple range test. Wheat plants cv. Leningradsкая 6 were grown under controlled conditions during two vegetation experiments (80 days).

**Table S3.** Coefficients of Ni biological accumulation and Ni translocation in wheat straw.

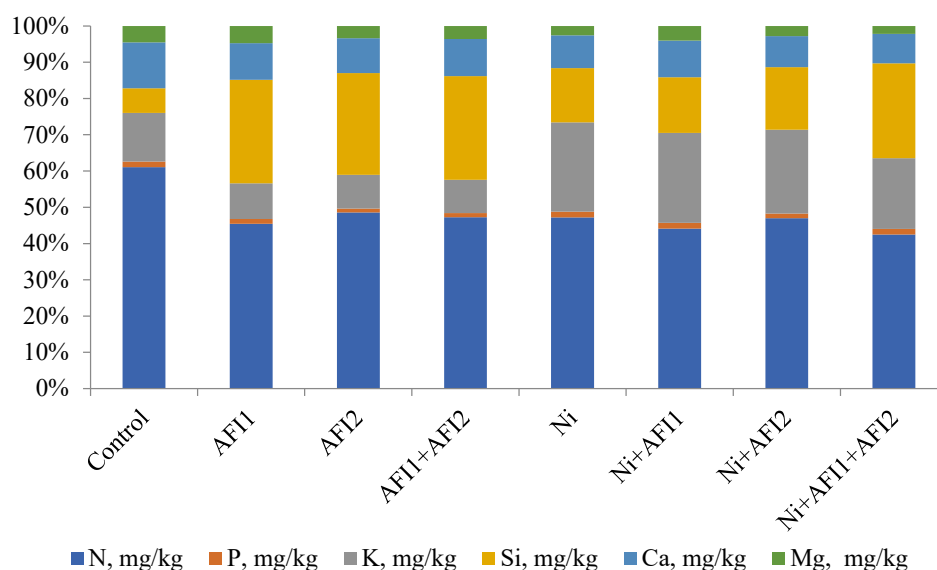
Variant	Ni	Ni+AFI1	Ni+AFI2	Ni+AFI1+AFI2
CBA, 1 <sup>st</sup> year	0.131±0.007 <sup>a</sup>	0.104±0.006 <sup>b</sup>	0.118±0.007 <sup>ab</sup>	0.111±0.006 <sup>b</sup>
CBA2, 2 <sup>nd</sup> year	0.166±0.009 <sup>a</sup>	0.123±0.007 <sup>c</sup>	0.145±0.008 <sup>b</sup>	0.146±0.008 <sup>b</sup>
CBA average	0.149±0.016 <sup>a</sup>	0.113±0.009 <sup>b</sup>	0.131±0.013 <sup>ab</sup>	0.128±0.016 <sup>ab</sup>
CT, 1 <sup>st</sup> year	0.077±0.004 <sup>a</sup>	0.069±0.004 <sup>ab</sup>	0.076±0.004 <sup>a</sup>	0.072±0.004 <sup>ab</sup>
CT 2 <sup>nd</sup> year	0.093±0.005 <sup>a</sup>	0.077±0.004 <sup>b</sup>	0.088±0.005 <sup>ab</sup>	0.090±0.005 <sup>a</sup>
CBA average	0.085±0.008 <sup>a</sup>	0.073±0.004 <sup>ab</sup>	0.082±0.006 <sup>a</sup>	0.081±0.008 <sup>ab</sup>

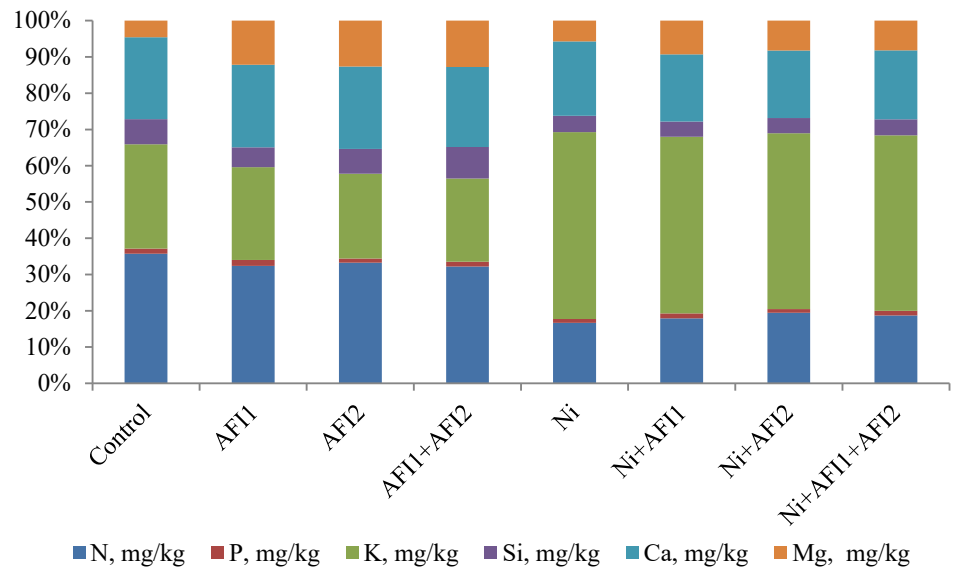
Notes: Ni: non-inoculated wheat plants, growing under Ni stress (100 mg Ni<sup>2+</sup> per 1 kg of soil). AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae* AFI2. CBA - Ni concentration in the straw/Ni concentration in the soil, CT - Ni concentration in the straw/Ni concentration in the roots. Bars with different letters in the rows are significantly different at  $p \leq 0.05$ , as determined by Duncan's multiple range test. Wheat plants cv. Leningradsкая 6 were grown under controlled conditions during two vegetation experiments (80 days).

**Table S4.** Effect of PGPB on the content of mobile fractions of elements in the soil at the end of the experiment.

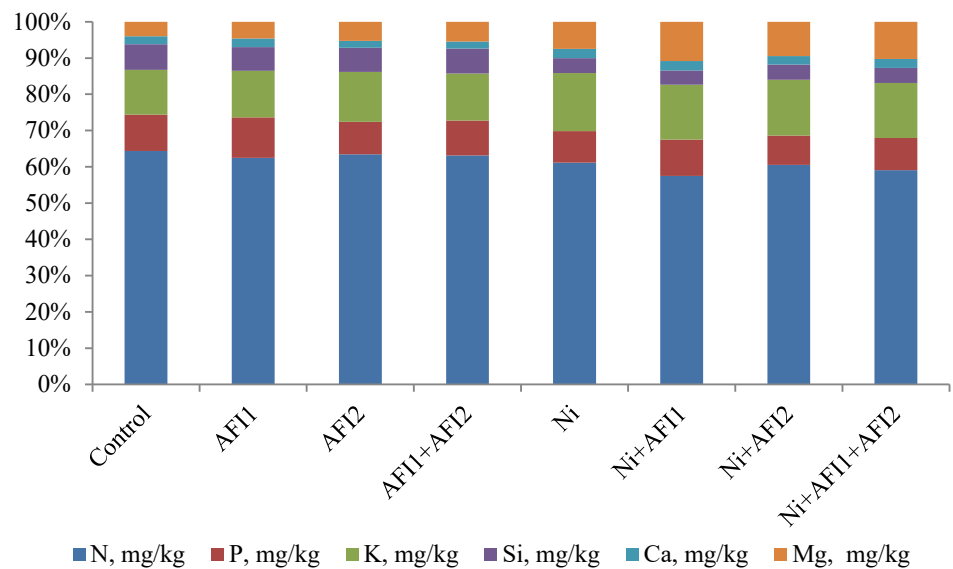
Variant	pH <sub>KCl</sub>	P <sub>2</sub> O <sub>5</sub> , mg/kg	K <sub>2</sub> O, mg/kg	N-NO <sub>3</sub> , mg/kg	N-NH <sub>4</sub> , mg/kg	Ni, mg/kg
Control	6.2±0.1 <sup>a</sup>	190.60±15.1 <sup>c</sup>	65.90±5.2 <sup>bc</sup>	26.30±2.1 <sup>d</sup>	7.58±0.6 <sup>c</sup>	0.8±0.1 <sup>c</sup>
Ni	5.8±0.2 <sup>a</sup>	214.30±17.0 <sup>b</sup>	90.90±7.2 <sup>a</sup>	51.30±4.1 <sup>b</sup>	10.07±0.8 <sup>a</sup>	93.81±7.4 <sup>a</sup>
Ni + AFI1	5.8±0.1 <sup>a</sup>	249.30±19.8 <sup>a</sup>	75.50±6.0 <sup>b</sup>	61.70±4.9 <sup>a</sup>	10.29±0.8 <sup>a</sup>	77.26±6.1 <sup>b</sup>
Ni + AFI2	5.8±0.2 <sup>a</sup>	204.40±16.2 <sup>bc</sup>	59.90±4.7 <sup>c</sup>	45.70±3.6 <sup>c</sup>	9.50±0.8 <sup>ab</sup>	83.43±6.6 <sup>b</sup>
Ni+AFI1+AFI2	5.8±0.2 <sup>a</sup>	213.10±16.9 <sup>b</sup>	71.10±5.6 <sup>bc</sup>	47.70±3.8 <sup>bc</sup>	8.58±0.7 <sup>b</sup>	80.50±6.4 <sup>b</sup>

Notes: Ni: non-inoculated wheat plants, growing under Ni stress (100 mg Ni<sup>2+</sup> per 1 kg of soil). AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae* AFI2. Bars with different letters are significantly different at  $p \leq 0.05$ , as determined by Duncan's multiple range test.

**Figure S2.** The effect of PGPB on relative content of macronutrients and silicon in wheat roots. Notes: **Control**: non-inoculated wheat cv. Leningradsкая 6. **Ni**: the addition of 100 mg/kg Ni<sup>2+</sup>. **AFI1** and **AFI2**: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Paenibacillus nicotianae* AFI2.



**Figure S3.** The effect of PGPB on relative content of macronutrients and silicon in wheat straw. Notes: Control: non-inoculated wheat cv. Leningradskaya 6. Ni: the addition of 100 mg/kg Ni<sup>2+</sup>. AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Pae-nibacillus nicotinae* AFI2.



**Figure S4.** The effect of PGPB on relative content of macronutrients and silicon in wheat grains. Notes: Control: non-inoculated wheat cv. Leningradskaya 6. Ni: the addition of 100 mg/kg Ni<sup>2+</sup>. AFI1 and AFI2: wheat plants inoculated with appropriate strains *Bacillus megaterium* AFI1 and *Pae-nibacillus nicotinae* AFI2.