Table 3. Mean AMF colonization, aboveground biomass and ANOVA results in the greenhouse trial for wheat at boot (GS 45) and late-milk (GS 77) growth stages† as affected by microbial inoculant treatments. Belowground biomass was sampled at the late-milk stage only.

AMF colonization Aboveground biomass

Treatments GS 45 GS 77 GS 45 GS 77

Percent root length ---------g pot-1---------

MYAP- 37.8 30.9 2.4 10.1

MYAP+ 40.2 53.0 1.7 9.4

OFAMF- 40.4 37.6 1.7 9.1

OFAMF+ 56.3 55.4 2.2 10.6

IMO- NA NA 2.5 12.5

IMO+ NA NA 2.2 13.2

ANOVA

Pr>F (5df)ns \*\*\*\*\*

CV (%) 32.9 31.1 22.4 17.1

Contrasts (Pr*>|t|)*

MYAP+ vs. MYAP- ns \* \* ns

OFAMF+ vs. OFAMF- ns \* ns \*

IMO+ vs. IMO- NA NA ns ns

IMO+/- vs. Other NA NA ns \*\*

ns, \*, \*\*, \*\*\* Not significant and significant at *P*< 0.05, *P*<0.01, and *P*<0.001 respectively.

MYAP-, untreated control for MYAP+; MYAP+, commercially available AMF inoculant; OFAMF-, sterilized on-farm produced AMF inoculant; OFAMF+, on-farm produced AMF inoculant; IMO-, sterilized on-farm produced indigenous microorganism inoculant; IMO+, on-farm produced indigenous microorganism inoculant; NA= not determined.

†Zadoks scale for growth staging cereals (Zadoks et al., 1974).

Table 4. Mean AMF colonization, wheat aboveground biomass at soft dough stage, grain yield and protein concentration; and ANVOA results in the field trial for wheat as affected by microbial inoculant treatment. The averages for 2012 and 2013 are presented in the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | AMF | Aboveground | Grain | Grain |
| Treatments | colonization | biomass | yield | protein |
|  | % | kg ha-1 | kg ha-1 | % |
| MYAP- | 48 | 6175 | 2417 | 13.7 |
| MYAP+ | 49 | 6037 | 2516 | 13.7 |
| OFAMF- | 43 | 6429 | 2603 | 13.6 |
| OFAMF+ | 48 | 5748 | 2446 | 13.5 |
| IMO- | 50 | 6514 | 2608 | 13.8 |
| IMO+ | 46 | 6412 | 2730 | 13.7 |
|  | ANOVA | | | |
| Pr>F (5df) | ns | ns | ns | ns |
| CV (%) | 17.9 | 24.8 | 24.1 | 4.3 |
| Contrasts (Pr*>|t|*) |  |  |  |  |
| MYAP+ vs. MYAP- | ns | ns | ns | ns |
| OFAMF+ vs. OFAMF- | ns | ns | ns | ns |
| IMO+ vs. IMO- | ns | ns | ns | ns |
| IMO+/- vs. Other | ns | \* | \* | ns |

ns, \*, Not significant and significant at *P*< 0.05.

MYAP-, untreated control for MYAP+; MYAP+, commercially available AMF inoculant; OFAMF-, sterilized on-farm produced AMF inoculant; OFAMF+, on-farm produced AMF inoculant; IMO-, sterilized on-farm produced indigenous microorganism inoculant; IMO+, on-farm produced indigenous microorganism inoculant.

Table 5. Mean macronutrient (N, Ca, K, Mg and P) uptake and ANOVA results in the greenhouse trial for wheat at late milk stage as affected by microbial inoculant treatment.

Treatments N Ca K Mg P

----------------------------------mg pot-1--------------------------------

MYAP- 161.6 14.1 191.0 25.7 19.5

MYAP+ 152.9 12.5 178.1 22.3 18.4

OFAMF- 155.5 14.9 170.2 24.6 14.5

OFAMF+ 150.3 14.9 164.1 26.4 18.5

IMO- 166.0 16.9 200.6 30.2 22.0

IMO+ 168.4 18.8 206.9 32.8 21.1

ANOVA

Pr>F (5df)ns ns\* *\*\** \*

CV (%) 8.2 24.1 15.2 19.2 7.1

Contrasts (Pr*>|t|*)

MYAP+ vs. MYAP- ns ns ns ns ns

OFAMF+ vs. OFAMF- ns ns ns ns \*

IMO+ vs. IMO- ns ns ns ns ns

IMO+/- vs. Other \* \* \*\* \*\* \*

ns, \*, \*\*, Not significant and significant at *P*< 0.05 and *P*<0.01 respectively.

MYAP-, untreated control for MYAP+; MYAP+, commercially available AMF inoculant; OFAMF-, sterilized on-farm produced AMF inoculant; OFAMF+, on-farm produced AMF inoculant; IMO-, sterilized on-farm produced indigenous microorganism inoculant; IMO+, on-farm produced indigenous microorganism inoculant.

Table 6. Mean macronutrient (N, Ca, K, Mg and P) uptake and ANOVA results in the field trial for wheat at soft dough stage as affected by microbial inoculant treatment. The averages for 2012 and 2013 are presented in the table.

Treatments N Ca K Mg P

------------------------------kg ha-1---------------------------

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MYAP- | 69.1 | 6.7 | 65.5 | 7.3 | 14.4 |
| MYAP+ | 71.0 | 5.7 | 63.4 | 7.4 | 14.9 |
| OFAMF- | 72.9 | 6.6 | 68.0 | 7.4 | 14.6 |
| OFAMF+ | 66.6 | 6.3 | 63.9 | 7.0 | 13.7 |
| IMO- | 77.6 | 6.4 | 69.1 | 7.9 | 16.0 |
| IMO+ | 74.7 | 6.8 | 72.4 | 8.0 | 15.4 |

ANOVA

Pr>F (5df) ns ns ns ns ns

CV (%) 36.5 40.0 39.0 20.7 24.1

Contrasts (Pr*>|t|*)

MYAP+ vs. MYAP- ns ns ns ns ns

OFAMF+ vs. OFAMF- ns ns ns ns ns

IMO+ vs. IMO- ns ns ns ns ns

IMO+/- vs. Other ns ns \* \* \*

ns, \*, Not significant and significant at *P*< 0.05.

MYAP-, untreated control for MYAP+; MYAP+, commercially available AMF inoculant; OFAMF-, sterilized on-farm produced AMF inoculant; OFAMF+, on-farm produced AMF inoculant; IMO-, sterilized on-farm produced indigenous microorganism inoculant; IMO+, on-farm produced indigenous microorganism inoculant.