**Table S1**. Two-way ANOVA analysis of the different parameters considered in this work. The effect of single variable (nutrient availability, NA or magnetic field (MF) intensity) and the variable interaction (NAxMF) was considered. Significant effects (p value < 0.05, 0.001, 0.001) are highlighted in bold

| | **p value of two-way ANOVA** | | |
|---|---|---|---|
| parameters | **Nutrient availability (NA)** | **Magnetic field (MF) intesity** | **NAxMF** |
| RL | **<0,001** | **<0.001** | 0.3873 |
| SA | **<0.001** | **<0.001** | **<0.05** |
| | | | |
| Cl | 0.2068 | 0.1766 | 0.1735 |
| NO3 | 0.9289 | 0.4211 | 0.1935 |
| PO43- | 0.5458 | 0.3222 | **<0.05** |
| SO42- | 0.7632 | **<0.001** | 0.4204 |
| S index | **<0.001** | 0.7343 | **<0.01** |
| | | | |
| *IRT1* | **<0.001** | **<0.05** | **<0.001** |
| *AHA2* | 0.06537 | 0.1859 | 0.6165 |
| *FRO2* | **<0.001** | **<0.05** | **<0.001** |
| *FIT* | **<0.001** | 0.1034 | 0.08463 |
| *bHLH38* | **<0.001** | **<0.001** | **<0.001** |
| *bHLH39* | **<0.001** | 0.1238 | 0.2294 |
| *PYE* | **<0.001** | **<0.001** | **<0.001** |
| *BTS* | 0.0002 | 0.0133 | **<0.05** |
| | | | |
| *SULTR1;1* | **<0.001** | **<0.001** | **<0.001** |
| *SULTR1;2* | 0.1604 | **<0.001** | **<0.05** |
| *SULTR1;3* | **<0.05** | **<0.001** | **<0.01** |
| *SULTR2;1* | **<0.01** | **<0.001** | **<0.001** |
| *SULTR2;2* | **<0,001** | **<0.001** | **<0.001** |
| *APR1* | | | |
| *APR2* | | | |
| | | | |
| *SPL7* | **<0.001** | **<0.001** | **<0.05** |
| | | | |
| FeSHOOT | **<0.001** | 0.4108 | 0.3649 |
| Fe ROOT | **<0.001** | 0.3824 | 0.2137 |
| Cu shoot | **<0.05** | 0.218 | 0.1345 |
| Cu root | 0.5026 | **<0.001** | **<0.01** |
| Mn shoot | 0.1322 | 0.9891 | 0.4331 |
| Mn root | 0.2809 | 0.2255 | 0.5634 |
| Zn shoot | **<0.001** | 0.9141 | 0.9805 |
| Zn root | **<0.001** | **<0.05** | 0.1783 |
| Mo shoot | **<0.001** | 0.3161 | 0.6244 |
| Mo root | **<0.001** | 0.1265 | 0.3367 |

**Table S2:** Macro and micro nutrient composition

| Name of the nutrients | Concentration (µM) | Control | -Fe | -S | -Fe-S |
|---|---|---|---|---|---|
| $MgSO_4$ $7H_2O$ | 750 | x | x | | |
| MgCl2 6H2O | 750 | | | x | x |
| $KH_2PO_4$ | 625 | x | x | x | x |
| $NH_4NO_3$ | 1000 | x | x | x | x |
| $KNO_3$ | 9400 | x | x | x | x |
| $CaCl_2$ $2H_2O$ | 1500 | x | x | x | x |
| MES pH5.5 with KOH | 1000 | x | x | x | x |
| $H_3BO_3$ | 50 | x | x | x | x |
| KI | 2.5 | x | x | x | x |
| $ZnCl_2$ | 15 | x | x | x | x |
| NaFeEDTA | 50 | x | | x | |
| $CoCl_2$ $6H_2O$ | 0.055 | x | x | x | x |
| $CuCl_2$ $2H_2O$ | 0.053 | x | x | x | x |
| $MnCl_2$ $4H_20$ | 50 | x | x | x | x |
| $Na_2$ $MoO_4$ $2H_2O$ | 0.52 | x | x | x | x |

**Table S3:** Primers used in this work

| Gene Code | Gene | Forward primer (5'-3') | Reverse primer (5'-3') |
|---|---|---|---|
| **REFERENC GENES** | | | |
| At2g37620 | *ACT1* | TGCACTTCCACATGCTATCC | GAGCTGGTTTTGGCTGTCTC |
| At5g19510 | *eEF1Balpha2* | ACTTGTACCAGTTGGTTATGGG | CTGGATGTACTCGTTGTTAGGC |
| At1g13440 | *GAPC2* | TCAGGAACCCTGAGGACATC | CGTTGACACCAACAACGAAC |
| At1g51710 | *UBP6* | GAAAGTGGATTACCCGCTG | CTCTAAGTTTCTGGCGAGGAG |
| **TARGET GENES** | | | |
| At4g30190 | *AHA2* | AAAGTTGCAGGAGAGGAAGC | GCACGATATCTGAAGCACCA |
| At1g01580 | *FRO2* | TCTCATCAATCCTCGGACCA | TTGTTGGTGTTGTGGTCGAT |
| At4g19690 | *IRT1* | CGGAATAGCGTTAGGGATCG | GCAGCTAGAAGATCCACGAG |
| At2g28160 | *FIT* | GAACATGCTCCTGATGCTCA | ACCCTTTCTCCTCCACTTGT |
| At3g56970 | *BHLH38* | TCAACGGTTTCTGCCACTAG | ACATCCACAAGAACAAACCCA |
| At3g56980 | *BHLH39* | TGTTTCTGTTTCGTCGGAGG | TAATTTTCCTGCGACGGTCA |
| At5g54680 | *ILR3* | GCTGCGAGATGAGAAACAGA | AGTAGGCATCATAGGTGGGG |
| At5g18830 | *SPL7* | GTTGCAGGGATTTTGGGGAG | GGTTCACAGGTTGCTCAGTG |
| At3g18290 | *BTS* | GATTCCCAATGGCAAAGCAC | GATTCCTAGTCCTTCCCCGA |

| Gene Code | Gene | Forward primer (5'-3') | Reverse primer (5'-3') |
|---|---|---|---|
| | | | |
| At3g47640 | *PYE* | GACTTGAACACCTCTCCTGC | GGCCTTGGAAAATGGGAAGT |
| At1g32640 | *MYC2* | GTCCGGTTCATTCTCAGACC | CGGAGCTTCGTTTACCTTCA |
| At1g80830 | *NRAMP1* | CGGAACTTATGCTGGACAAT | AGAAGAGGAACCAACGCAAA |
| At4g04610 | *APR1* | CATTGGAGCCAAAAGTTTCGC | TCCTCAATCTCAACCACATCAAC |
| At1g62180 | *APR2* | CGGTGTTGGAAGTCTTGTGA | CTCACACCCGATTGACACAT |
| At5g01600 | *FER1* | TCGTTGAGAGTGAATTTCTGG | ACCCCAACATTGGTCATCTG |
| At5g23980 | *FRO4* | AATAGCGATGTGGGTGACGA | TCATGCAGAACCACGAGTCT |
| At5g23990 | *FRO5* | AGACAAGAAGCCCGAGACAA | GGGTCCAAGAACAGGTGAGA |
| At5g11260 | *HY5* | GGAGTTTGGAGGAGAAGCTG | TTCAGCCGCTTGTTCTCTTT |
| At4g08620 | *SULTR1;1* | TTGCTCAGCCACTTCCGTAC | CTCAAGAGCCTCGAGAAGC |
| At1g78000 | *SULTR1;2* | CCATCCTCGCAGCTATCATC | AGAATGCTCCAATACAGGCG |

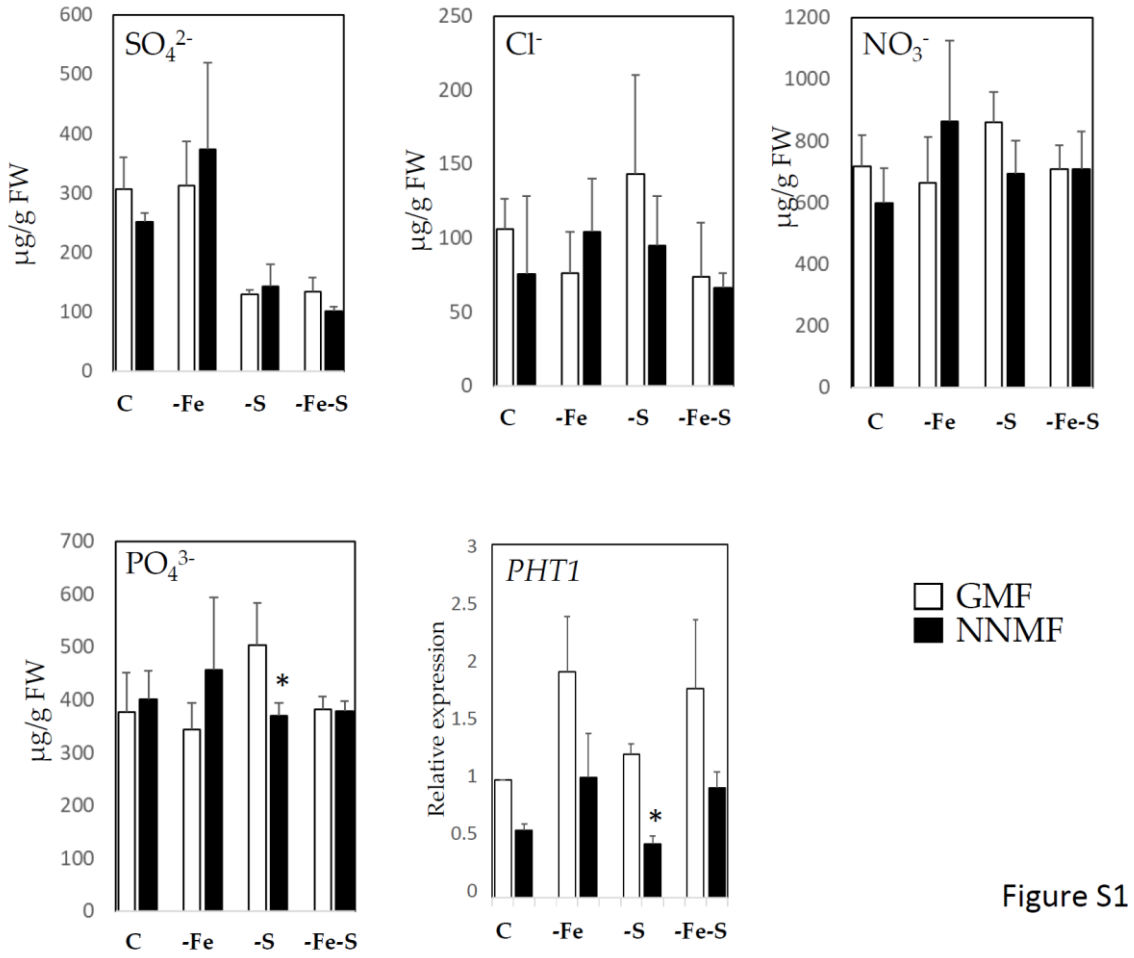


**Figure S1**. Inorganic anion (upper panel $Cl^-$, $SO_4^{3-}$, $NO_3^-$) concentration and phosphate ($PO_4^{3-}$) and PHT1 gene expression (lower panel) of Arabidopsis thaliana seedlings and grown under full nutrient condition (C), absence of iron (-Fe), absence of sulfur (-S) and combined Fe and S deficiency (-Fe-S). Determination were performed 7 days after transferring seedlings to NNMF conditions. Mean value (±SE) are from 3 independent biological experiments and asterisk indicate statistical difference ($p<0.05$) between GMF- and NNMF-exposed plants. Two-way ANOVA results are reported in the Table S1

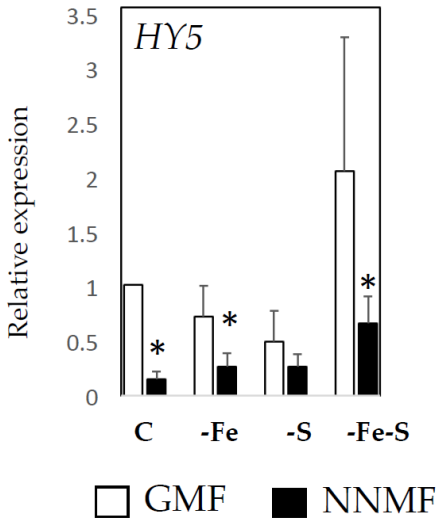


**Figure S2.** Expression of gene HY5 in Arabidopsis thaliana seedlings grown under full nutrient condition (C), absence of iron (-Fe), absence of sulfur (-S) and combined Fe and S deficiency (-Fe-S). Plants were exposed for 7 days both to GMF and NNMF conditions. Data are from three independent experiment (n=3) and asterisk indicate statistical difference ($p<0.05$) between GMF- and NNMF-exposed plants. Values are expressed as fold change (SE) with respect to control plants growing in GMF conditions under full nutrient media (C). Two-way ANOVA results are reported in the Table S1