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Research article

Rhizobial inoculation and UAV-derived vegetation index associated with grain yield in common bean

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Supplementary material

Table S1. Analysis of variance for grain yield (GY), Accumulated nitrogen (AN), canopy area (CA), relative inoculation efficiency (RIE), nitrogen use efficiency (NUE) and SPAD index of common bean cultivars under different nitrogen sources.

Variable	Source of variation	df	F-value	P-value
GY	Cultivar	6	8.105	0.000
GY	Nitrogen source	3	37.135	0.000
GY	Block	3	3.304	0.024
GY	Cultivar × Nitrogen source	18	1.663	0.064
GY	Residual	81		
AN	Cultivar	6	2.138	0.058
AN	Nitrogen source	3	14.895	0.000
AN	Block	3	1.398	0.249
AN	Cultivar × Nitrogen source	18	0.817	0.675
AN	Residual	81		
CA – 25 DAS	Cultivar	6	8.792	0.000
CA – 25 DAS	Nitrogen source	3	12.447	0.000
CA – 25 DAS	Block	3	2.607	0.057
CA – 25 DAS	Cultivar × Nitrogen source	18	1.276	0.226
CA – 25 DAS	Residual	81		
CA – 35 DAS	Cultivar	6	15.256	0.000
CA – 35 DAS	Nitrogen source	3	15.053	0.000
CA – 35 DAS	Block	3	2.166	0.098
CA – 35 DAS	Cultivar × Nitrogen source	18	1.185	0.293
CA – 35 DAS	Residual	81		
CA – 50 DAS	Cultivar	6	1.753	0.119
CA – 50 DAS	Nitrogen source	3	5.250	0.002
CA – 50 DAS	Block	3	0.509	0.677
CA – 50 DAS	Cultivar × Nitrogen source	18	1.584	0.084
CA – 50 DAS	Residual	81		
CA – 65 DAS	Cultivar	6	6.132	0.000
CA – 65 DAS	Nitrogen source	3	22.027	0.000
CA – 65 DAS	Block	3	0.207	0.891
CA – 65 DAS	Cultivar × Nitrogen source	18	1.469	0.123
CA – 65 DAS	Residual	81		
SPAD – 25 DAS	Cultivar	6	4.461	0.001
SPAD – 25 DAS	Nitrogen source	3	8.415	0.000
SPAD – 25 DAS	Block	3	0.101	0.959
SPAD – 25 DAS	Cultivar × Nitrogen source	18	0.816	0.677
SPAD – 25 DAS	Residual	81		
SPAD – 35 DAS	Cultivar	6	13.588	0.000
SPAD – 35 DAS	Nitrogen source	3	0.816	0.489
SPAD – 35 DAS	Block	3	1.070	0.366

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Variable	Source of variation	df	F-value	P-value
SPAD – 35 DAS	Cultivar × Nitrogen source	18	0.693	0.808
SPAD – 35 DAS	Residual	81		
SPAD – 50 DAS	Cultivar	6	11.301	0.000
SPAD – 50 DAS	Nitrogen source	3	11.368	0.000
SPAD – 50 DAS	Block	3	1.266	0.292
SPAD – 50 DAS	Cultivar × Nitrogen source	18	1.375	0.167
SPAD – 50 DAS	Residual	81		
SPAD – 65 DAS	Cultivar	6	13.039	0.000
SPAD – 65 DAS	Nitrogen source	3	7.629	0.000
SPAD – 65 DAS	Block	3	1.819	0.15
SPAD – 65 DAS	Cultivar × Nitrogen source	18	1.232	0.257
SPAD – 65 DAS	Residual	81		
RIE	Cultivar	6	1.792	0.126
RIE	Nitrogen source	1	22.840	0.000
RIE	Block	3	3.626	0.021
RIE	Cultivar × Nitrogen source	6	0.638	0.699
RIE	Residual	39		
NUE	Cultivar	6	1.162	0.369
NUE	Block	3	0.417	0.743
NUE	Residual	18		

*Note: df. degrees of freedom. Effects were considered significant at $P \leq 0.05$.

Table S2. Estimated marginal means of relative inoculation efficiency (RIE) for the rhizobial strains evaluated in common bean.

Rhizobial strain	Estimated mean RIE	SE	95% CI
CIAT 899	3.9%	10.7	−17.8 to 25.6
UFLA 02-100	76.3%	10.7	54.6 to 98.0

*Note: RIE. relative inoculation efficiency; SE. standard error; CI. confidence interval. Values represent estimated marginal means across cultivars.

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