**Supplementary Material Cover Sheet**

**The nitrogen nutrition of yam (Dioscorea spp)**

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Table 1 of supplementary material: Effect of fertilizer (no fertilizer, –F, or labelled fertilizer applied at 70 d after planting [DAP], 15Nday70, or labelled fertilizer applied at 110 DAP, 15Nday110) and year (2006 and 2007) on dry matter production in different plant parts of *D. rotundata* grown in Central Côte d’Ivoire.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | leaves | vines | roots | tubers | whole plant | fallen shoots |
| Variable | DAP | -F vs. 15Nday70 | | | | | |
| Fertilizer | 90 | \*\* | \*\* | ns | \*\* | \*\* |  |
| Year | ns | ns | \* | \*\* | \* |  |
| Fertilizer x Year | ns | ns | ns | ns | ns |  |
| Fertilizer |  | \*\*\* | \*\* | ns | \* | \*\* | \*\* |
| Year | 130 | \*\* | ns | \* | \* | \* | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns | ns |
| Fertilizer | 160 | \* | \*\*\* | ns | \*\* | \*\* | \* |
| Year | ns | ns | \* | ns | ns | ns |
| Fertilizer x Year | ns | ns | ns | ns | ns | ns |
| Fertilizer | 190 |  | \* | ns | \* | \* | \* |
| Year |  | ns | \*\*\* | ns | ns | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns |
|  |  | -F vs. 15Nday110 | | | | | |
| Fertilizer | 90 | \*\* | \*\* | ns | \* | \*\* |  |
| Year | ns | ns | \* | \* | \* |  |
| Fertilizer x Year | ns | ns | ns | ns | ns |  |
| Fertilizer |  | \*\* | \*\* | ns | \* | \* | \* |
| Year | 130 | \*\* | ns | \* | \* | \*\* | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns | ns |
| Fertilizer | 160 | \* | \*\*\* | ns | \* | \* | \* |
| Year | \* | ns | \* | ns | ns | ns |
| Fertilizer x Year | ns | ns | ns | ns | ns | ns |
| Fertilizer | 190 |  | \* | ns | \*\* | \*\* | \* |
| Year |  | ns | \* | ns | ns | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns |
|  |  | 15Nday70 vs. 15Nday110 | | | | | |
| Treatments | 90 | ns | ns | ns | ns | ns | ns |
| Treatments | 130 | ns | ns | ns | ns | ns | ns |
| Treatments | 160 | ns | ns | ns | ns | ns | ns |
| Treatments | 190 | ns | ns | ns | ns | ns | ns |

-F: no fertilizer applied

15Nday70 : 15N-labeled fertilizer applied at 70 DAP

15Nday110 : 15N-labeled fertilizer applied at 110 DAP

\*, \*\*, \*\*\* and ns indicate significance at 0.05, 0.01 or <0.0001 probability or non-significance at 0.05 probability, respectively, of average values of 4 replicates

Table 2 of supplementary material: Effect of fertilizer (no fertilizer, –F, or labelled fertilizer applied at 70 d after planting [DAP], 15N-day70, or labelled fertilizer applied at 110 DAP, 15N-day110) and year (2006 and 2007) on N uptake in different plant organs of *D. rotundata* grown in Central Côte d’Ivoire.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | leaves | vines | roots | tubers | whole plant | fallen shoots |
| Variable | DAP | -F vs. 15Nday70 | | | | | |
| Fertilizer | 90 | \*\*\* | \*\*\* | \*\*\* | \*\*\* | \*\*\* |  |
| Year | ns | \*\* | ns | ns | ns |  |
| Fertilizer x Year | ns | ns | ns | ns | ns |  |
| Fertilizer |  | \*\*\* | \*\*\* | ns | \*\*\* | \*\*\* | \*\* |
| Year | 130 | ns | ns | ns | ns | ns | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns | \*\* |
| Fertilizer | 160 | \* | \*\*\* | ns | \*\* | \*\* | \* |
| Year | ns | ns | ns | ns | \* | ns |
| Fertilizer x Year | ns | ns | ns | ns | ns | \*\* |
| Fertilizer | 190 |  | \*\* | ns | \*\* | \*\* | \* |
| Year |  | \* | \*\* | ns | \* | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | \*\* |
|  |  | -F vs. 15Nday110 | | | | | |
| Fertilizer | 90 | \*\*\* | \*\* | ns | \*\* | \*\*\* |  |
| Year | ns | \* | ns | ns | ns |  |
| Fertilizer x Year | ns | ns | ns | ns | ns |  |
| Fertilizer |  | \*\*\* | \*\*\* | \* | \*\*\* | \*\*\* | \* |
| Year | 130 | \* | ns | ns | ns | ns | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | ns | \* |
| Fertilizer | 160 | ns | \*\* | ns | \*\* | \*\* | \*\* |
| Year | \* | ns | ns | ns | \* | ns |
| Fertilizer x Year | ns | ns | ns | ns | ns | \* |
| Fertilizer | 190 |  | \* | ns | \* | \* | \* |
| Year |  | \* | \* | ns | \* | ns |
| Fertilizer x Year |  | ns | ns | ns | ns | \* |
|  |  | 15Nday70 vs. 15Nday110 | | | | | |
| Treatments | 90 | ns | ns | ns | ns | ns | ns |
| Treatments | 130 | ns | ns | ns | ns | ns | ns |
| Treatments | 160 | ns | ns | ns | ns | ns | ns |
| Treatments | 190 | ns | ns | ns | ns | ns | ns |

-F: no fertilizer applied

15Nday70 : 15N-labeled fertilizer applied at 70 DAP

15Nday110 : 15N-labeled fertilizer applied at 110 DAP

\*, \*\*, \*\*\* and ns indicate significance at 0.05, 0.01 or <0.0001 probability or non-significance at 0.05 probability, respectively, of average values of 4 replicates

Table 3 of supplementary material: Effect of 15N-labeled fertilizer application time (70 DAP or 110 DAP) and year (2006 and 2007) on the amount of N derived from fertilizer in different plant parts of *D. rotundata* (n = 4) grown in Central Côte d’Ivoire.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | DAP | leaves | vines | roots | tubers | whole plant | fallen shoots |
| 15N application time | 130 | \* | ns | ns | \* | \* |  |
| Year | ns | ns | ns | ns | \* |  |
| 15N application time x Year | ns | ns | ns | ns | ns |  |
| 15N application time |  | \* | ns | ns | \* | \* | ns |
| Year | 160 | ns | ns | ns | \* | \* | ns |
| 15N application time x Year |  | ns | ns | ns | ns | ns | ns |
| 15N application time | 190 |  | \* | ns | \* | \* | ns |
| Year |  | ns | ns | \* | \* | ns |
| 15N application time x Year |  | ns | ns | ns | ns | ns |

\*, \*\*, \*\*\* and ns indicate significance at 0.05, 0.01 or <0.0001 probability or non-significance at 0.05 probability, respectively, of average values of 4 replicates

Table 4 of supplementary material: Effect of 15N-labelled fertilizer application time (70 DAP or 110 DAP) and year (2006 and 2007) on nitrogen derived from fertilizer (g m-2) in different plant parts of *D. rotundata* (n = 4) grown in Central Côte d’Ivoire.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | N derived from fertilizer in 2006 | | | | | |  | N derived from fertilizer in 2007 | | | | | |
| DAP | Treatment | Leaves | Vines | Roots | Tubers | Whole plant | Fallen shoots |  | Leaves | Vines | Roots | Tubers | Whole plant | Fallen shoots |
|  | 15Nday70 | 0.18a | 0.05b | 0.02c | 0.07b | 0.32 |  |  | 0.14a | 0.01b | 0.01b | 0.03b | 0.19 |  |
| 90 | 15Nday110 | na | na | na | na | na |  |  | na | na | na | na | na |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15Nday70 | 0.26a | 0.03b | 0.03b | 0.31a | 0.64 | 0.08 |  | 0.42a | 0.01b | 0.006b | 0.38a | 0.82 | 0.03 |
| 130 | 15Nday110 | 0.22a | 0.04b | 0.01b | 0.34a | 0.62 | 0.11 |  | 0.17a | 0.01b | 0.008b | 0.20a | 0.40 | 0.01 |
|  |  | *ns* | *ns* | *ns* | *ns* | *ns* | *ns* |  | *\*\** | *ns* | *ns* | *\*\** | *\*\** | *ns* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15Nday70 | 0.12b | 0.02c | 0.003d | 1.14a | 1.29 | 0.44 |  | 0.10b | 0.01c | 0.002d | 0.41a | 0.54 | 0.26 |
| 160 | 15Nday110 | 0.09b | 0.02c | 0.007d | 0.73a | 0.86 | 0.31 |  | 0.04b | 0.03b | 0.004c | 0.52a | 0.60 | 0.28 |
|  |  | *ns* | *ns* | *ns* | *ns* | *ns* | *ns* |  | *\** | *ns* | *ns* | *ns* | *ns* | *ns* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 15Nday70 |  | 0.04b | 0.001c | 1.10a | 1.14 | 0.64 |  |  | 0.01b | 0.0006c | 0.55a | 0.56 | 0.39 |
| 190 | 15Nday110 |  | 0.007b | 0.003b | 0.87a | 0.88 | 0.59 |  |  | 0.01b | 0.0002c | 0.50a | 0.52 | 0.49 |
|  |  |  | *\** | *ns* | *ns* | *ns* | *ns* |  |  | *ns* | *ns* | *ns* | *ns* | *ns* |

\*, \*\* and ns indicate significance at 0.05 or 0.01 probability or non-significance at 0.05 probability, respectively, of average values (n=4) within column.

Numbers with similar small letter are not significantly different at 0.05 probability in the same row for each treatment within year.

na: not applicable, the 15N labelled fertilizer was only added at 110 DAP in the 15N-day110 treatment.



Figure 1 of supplementary material: Effect of fertilization (-F, +F) on dry matter production in plant different parts in *D. rotundata* grown in Central Côte d’Ivoire in 2006 and 2007. Means with similar letter are not significantly different at *p*≤0.05 according to LSD test. Vertical bars are standard errors of the mean of 4 replicates.



Figure 2 of supplementary material: Effect of fertilization (-F, +F) on nitrogen uptake in plant different organs in *D. rotundata* grown in Central Côte d’Ivoire in 2006 and 2007. Means with similar letter are not significantly different at *p*≤0.05 according to LSD test. Vertical bars are standard errors of the mean of 4.



Figure 3 of supplementary material: Effect of fertilization (-F, +F) on nitrogen uptake in fallen shoots in *D. rotundata* grown in Central Côte d’Ivoire in 2006 and 2007. Means with similar letter are not significantly different at *p*≤0.05 according to LSD test. Vertical bars are standard errors of the mean of 4.





Figure 4 of supplementary material. 15N-labelled fertilizer recovery partitioning into plant different parts and its accumulation in fallen shoots overtime in 2006 and in 2007 with *D. rotundata* grown in central Côte d’Ivoire. 15N-fertilizer recovery was calculated from the cross-design treatment. Vertical bars are standard errors of the mean of 8 replicates. Bars with similar letter are not significantly different at P≤0.05 according to LSD test.