Table S1. Results of one-factorial statistical analysis (*Tukey*-Kramer) of nitrate- (NO_3^-–N) and ammonium- (NH_4^+-N) contents at BBCH stages 17 (7 leaves unfolded), 55 (middle of tassel emergence), 71 (beginning of grain development) and 89 (fully ripe). Arithmetic means ± standard error. Data from Environment Bergen 2020 (BR20). Four replications. Significance at p<0.05. Different letters indicate significance.

BBCH Stage	Soil depth [m]	Unit	NO_3^--N [1]		NH_4^+-N [2]	
			FCM [3]	RCM [4]	FCM	RCM
17			17.82 ± 4.04	11.59 ± 1.99	4.13 ± 1.35	1.88 ± 0.47
55	0 to 0.3		26.16 ± 5.61	29.29 ± 1.12	0.73 ± 0.22	0.78 ± 0.15
71			11.97 ± 1.85 b	35.53 ± 9.06 a	0.43 ± 0.06 b	0.82 ± 0.13 a
89			7. 91 ± 1.02	11.38 ± 0.81	0.80 ± 0.31	1.05 ± 0.25
17			5.63 ± 3.78	3.00 ± 0.79	0.61 ± 0.18	0.44 ± 0.09
55	0.3 to 0.6	[kg ha^{-1}]	8.82 ± 1.49	5.46 ± 1.98	0.23 ± 0.09	0.17 ± 0.03
71			7.59 ± 3.00	5.06 ± 0.65	0.19 ± 0.02 b	0.25 ± 0.02 a
89			3.10 ± 0.72	3.94 ± 0.82	0.28 ± 0.08	0.27 ± 0.06
17			9.63 ± 3.05	6.38 ± 0.53	0.51 ± 0.02	0.36 ± 0.01
55	0.6 to 0.9		9.69 ± 1.24	11.62 ± 4.53	0.29 ± 0.07	0.21 ± 0.13
71			9.36 ± 0.89	7.30 ± 0.88	0.21 ± 0.02	0.17 ± 0.04
89			7.46 ± 0.94	7.07 ± 0.91	0.22 ± 0.03	0.26 ± 0.04

[1] Nitrate nitrogen content [2] Ammonium nitrogen content [3] Flat cultivation method [4] Ridge cultivation method.

Table S2. Results of one-factorial statistical analysis (*Tukey*-Kramer) of maize plant development at BBCH stages 17 (7 leaves unfolded) and 55 (middle of tassel emergence). Arithmetic means ± standard error. Data from Environment Bergen 2020 (BR20). Four replications per parameter. Significance p<0.05. Different letters indicate significance.

Parameter	Unit	BBCH 17		BBCH 55	
		FCM [1]	RCM [2]	FCM	RCM
Fresh matter yield (whole plant)	[t ha⁻¹]	1.78 ± 0.39	2.13 ± 0.66	1.25 ± 2.41	1.55 ± 2.18
Dry matter yield (whole plant)		0.19 ± 0.04	0.23 ± 0.06	1.55 ± 0.27	2,03 ± 0.29
Fresh matter yield (roots)		0.42 ± 0.07	0.54 ± 0.13	-	-
Dry matter yield (roots)		0.04 ± 0.007	0.05 ± 0.01	-	-
Dry matter yield (leaves)		-	-	0.90 ± 0.13	1.03 ± 0.12
Dry Matter yield (stem)		-	-	0.69 ± 0.16	1.05 ± 0.23
Average FM weight (whole plant) [3]	[g]	13.73 ± 2.21	18.96 ± 5.86	99.49 ± 20.59	139.19 ± 22.45
Average FM weight (leaves) [3]		-	-	38.33 ± 5.93	49.02 ± 5.57
Average FM weight (stem) [3]		-	-	58.05 ± 14.06	86.52 ± 17.09
N accumulation (whole plant)	[kg ha⁻¹]	4.43 ± 0.96	5.67 ± 1.94	20.22 ± 2.65	26.57 ± 5.12
N accumulation (roots)		0.45 ± 0.11	0.58 ± 0.15	-	-
N accumulation (leaves)		-	-	14.52 ± 2.36	17.28 ± 3.11
N accumulation (stems)		-	-	5.92 ± 1.24	7.74 ± 1.47
N concentration (whole plant)	[%]	2.27 ± 0.18	2.36 ± 0.18	1.35 ± 0.13	1.28 ± 0.06
N concentration (roots)		1.06 ± 0.09	1.14 ± 0.07	0.66 ± 0.03	0.61 ± 0.04
N concentration (leaves)		-	-	1.61 ± 0.12	1.65 ± 0.11
N concentration (stem)		-	-	0.88 ± 0.04	0.75 ± 0.03
P accumulation (whole plant)	[kg ha⁻¹]	14.00 ± 4.00	17.00 ± 6.00	122.00 ± 9.00	117.00 ± 21.00
C:N ratio (whole plant)	%	17.72 ± 1.10	17.17 ± 1.66	32.90 ± 3.17	34.43 ± 1.38
C:N ratio (roots)		41.33 ± 3.48	38.14 ± 2.43	68.32 ± 3.11	70.82 ± 6.68
C:N ratio (leaves)		-	-	29.06 ± 2.12	28.64 ± 1.87
C:N ratio (stem)		-	-	48.33 ± 2.15	57.92 ± 2.96

[1] Flat cultivation method. [2] Ridge cultivation method. [3] Average FM weight of a single maize plant.

Table S3. Results of one-factorial statistical analysis of maize plants development with *Tukey*-Kramer. Arithmetic means ± standard error of all Environments. Eight replications for Bösenbrunn 2017 (BB17) and Oberhermsgrün 2018 (OG18), Four replications for Bergen 2020 (BR20). Significant difference at $p < 0.05$. Different letters indicate significance.

Parameter	Unit	BB17 [1]		OG18 [2]		BR20 [3]	
		FCM [4]	RCM [5]	FCM	RCM	FCM	RCM
Fresh matter yield (whole plant) [6]	[t ha^{-1}]	38.03 ± 2.08 b	48.08 ± 2.56 a	15.02 ± 0.94	14.75 ± 0.49	29.34 ± 2.91	29.97 ± 2.21
Dry matter yield (whole plant) [6]		11.36 ± 0.86 b	15.04 ± 1.08 a	3.86 ± 0.31	4.17 ± 0.21	7.13 ± 0.88	7.69 ± 0.96
Dry matter yield (leaves and husk) [6]		3.30 ± 0.22 b	4.36 ± 0.32 a	1.11 ± 0.08	1.25 ± 0.06	1.99 ± 0.26	2.17 ± 0.03
Dry matter yield (stem) [6]		2.25 ± 0.18 b	3.04 ± 0.25 a	1.19 ± 0.12	1.23 ± 0.07	2.08 ± 0.25	1.95 ± 0.22
Dry matter yield (corn cob) [6]		6.91 ± 0.55 b	8.97 ± 0.64 a	1.56 ± 0.15	1.69 ± 0.10	3.05 ± 0.51 b	3.57 ± 0.53 a
Leaves and stem proportion of total DM yield [6]	[%]	39.38 ± 2.12	40.21 ± 1.10	59.73 ± 1.77	59.44 ± 1.37	57.64 ± 2.03	54.15 ± 1.87
Corn cob proportion of total DM yield [6]		60.62 ± 2.12	59.79 ± 1.10	40.27 ± 1.77	40.56 ± 1.37	42.36 ± 2.03	45.85 ± 1.87
Crude protein yield (whole plant) [6]	[kg ha^{-1}]	645.05 ± 59.23	819.95 ± 63.75	292.09 ± 25.81	306.34 ± 15.28	467.01 ± 54.86	486.78 ± 46.15
Crude protein yield (leaves and stem) [6]		252.91 ± 23.77	330.25 ± 27.98	174.18 ± 15.40	182.50 ± 10.85	267.18 ± 28.77	261.67 ± 20.24
Crude protein yield (corn cob) [6]		392.15 ± 41.55	489.69 ± 38.20	117.91 ± 12.42	123.84 ± 6.44	199.83 ± 28.34 b	225.11 ± 27.09 a
N accumulation (whole plant) [7]	[kg ha^{-1}]	-	-	49.49 ± 5.46	61.87 ± 13.40	89.03 ± 10.54	101.29 ± 8.36
N accumulation (leaves and husk) [7]		-	-	13.24 ± 1.59	13.36 ± 0.83	26.87 ± 1.94	28.57 ± 3.84
N accumulation (stem) [7]		-	-	7.45 ± 0.80	8.74 ± 0.58	8.66 ± 0.74	8.40 ± 0.52
N accumulation (corn cob) [7]		-	-	23.55 ± 2.60	26.41 ± 2.26	41.54 ± 4.16	44.72 ± 3.13
P accumulation (whole plant) [7]	[kg ha^{-1}]	-	-	6.43 ± 0.69	5.96 ± 0.61	2.57 ± 0.15	2.64 ± 0.08
N concentration (whole plant) [7]	[%]	-	-	1.30 ± 0.05	1.44 ± 0.22	1.23 ± 0.06	1.26 ± 0.11
N concentration (leaves and husk) [7]		-	-	1.19 ± 0.04	1.09 ± 0.04	1.37 ± 0.05	1.32 ± 0.08
N concentration (stem) [7]		-	-	0.68 ± 0.05	0.70 ± 0.03	0.41 ± 0.01	0.43 ± 0.03
N concentration (corn cob) [7]		-	-	1.51 ± 0.04	1.61 ± 0.04	1.37 ± 0.04	1.30 ± 0.08
C:N ratio (whole plant) [7]	[%]	-	-	33.15 ± 0.58	31.61 ± 3.57	34.86 ± 1.55	35.57 ± 2.92
C:N ratio (leaves and husk) [7]		-	-	36.76 ± 0.97	41.05 ± 1.35	32.03 ± 1.18	33.86 ± 2.64
C:N ratio (stem) [7]		-	-	62.14 ± 4.05	60.29 ± 1.40	107.65 ± 3.32	102.08 ± 6.28
C:N ratio (corn cob) [7]		-	-	28.71 ± 0.18	28.75 ± 0.69	32.53 ± 1.12	33.14 ± 1.86

[1] Bösenbrunn 2017 [2] Oberhermsgrün 2018 [3] Bergen 2020 [4] Flat cultivation method. [5] Ridge cultivation method [6] Values from BB17, OG18 and BR20. [7] Values from OG18 and BR20