Nitrogen fertilization of perennial ryegrass: split application

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APPLIED PLANT RESEARCH
WAGENINGEN UR

Nitrogen needs of the crop and nitrogen supply

- Nitrogen supply by fertilizer and mineralization
- Mineralization depends on temperature and humidity
- Hard to forecast quantity of mineralized nitrogen
- Highest need of nitrogen during stem elongation

What are possibilities of split application?

- Decrease risk of too much (lodging) / less nitrogen
- Increase N use efficiency / decrease N losses
- What is best crop development stage?
- What is effect of soil type and variety/type?

  Trials with cv. Elgon (early tetraploid) in 2000 (1), 2001 (1), 2002 (2), 2003 (2) and 2005 (2)

Design trials 2000/2001 (kg N/ha), clay soil

- Advice 165-0.6x(soil mineral N)
- Advice+45
- Advice-45
- Advice-90
- Advice-60, +60 flag leaf stage

Effect of nitrogen fertilization on seed yield of Elgon on clay soil (average 2 trials 2000/2001)

Nitrogen (kg/ha)	**N-uptake (kg/ha)**	**Seed yield (kg/ha)**
Advice (153)	**152**	**2.370**
advice+45	178	2.510
advice-45	92	1.990
advice-90	86	1.600
advice-60/45 + 60/45 flag leaf	**134**	**2.400**

Design trials2002/2003/2005 (kg N/ha), clay and sandy soil

Early spring	DC 32	Flag leaf
advice		
advice	30	
advice		30
advice+45		
advice-30		
advice-30	30	
advice-30	60	
advice-30		30
advice-30		60
advice-30		30 (CN)
advice-60		
advice-60	30	
advice-60	60	
advice-60		30
advice-60		60
advice-90		

Effect of splitting nitrogen (kg/ha) on seed yield Elgon (average 4 trials on clay and sand, 2002/2003)

start	Seed yield (kg/ha)					
	0	**DC32 30**	**DC32 60**	**Flag leaf 30**	**Flag leaf 60**	**Flag leaf 30 CN**
advice+ 45	2260	-	-	-	-	-
advice	**2080**	2160	-	2180	-	-
advice- 30	1950	**2040**	2080	**2090**	2160	2050
advice- 60	1820	2000	**1980**	2020	**2070**	-
advice- 90	1450	-	-	-	-	-

Provisional conclusions splitting nitrogen

- Split N application at DC32 lodging ≥ non split ≥ split flag leaf
- Seed yield: splitting nitrogen at flag leaf stage ∞ non split, splitting nitrogen at DC32 ≤ non split
- N uptake: non split ≥ split DC32 ≥ flag leaf (not clay 2003)
- No stability of results for soil type (→trials 2005)
- No information effect of variety (2007?)

More information

- All our reports are published on: www.kennisakker.nl