

DISTRIBUTION OF N FERTILIZER APPLIED BY AIRCRAFT

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Distribution of N fertilizer on pasture by aircraft was found to be quite variable (Table 1, Figure 1) with a standard deviation of 26 kg N/ha.

Table 1. Nitrogen fertilizer rate distribution in three areas of a pasture as flown on by aircraft

Container	A R E A S		
	1	2	3 [†]
	kg N/ha		
1	125.8	64.5	188.3
2	64.0	40.7	85.2
3	32.2	61.8	93.6
4	37.5	121.0	63.7
5	38.6	47.6	28.0
6	77.7	64.5	23.5
7	76.5	54.0	77.2
8	34.2	38.3	97.5
9	77.6	88.3	62.8
10	27.7	51.7	73.8
> Mean	59.2	63.2	79.4

[†] Overlap of fertilizer application because of marking error

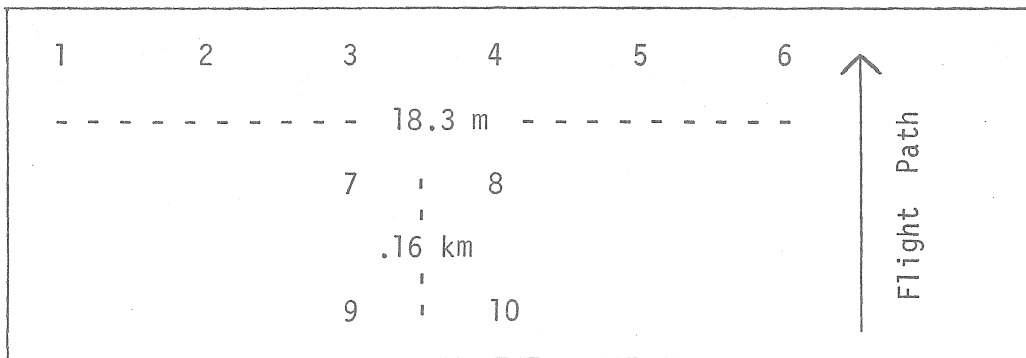


Figure 1. Distribution of containers for measuring fertilizer rates and distribution

Loss in efficiency of N fertilizer can result with this type of distribution pattern (Lutz et al. 1975). If the response to nitrogen is linear, then theoretically average yield would be the same as an even distribution of fertilizer as follows (Figure 2).

$$\frac{\Delta Y}{\Delta N} = \frac{dy}{dn}$$

If the response is not linear, but quadratic (curvilinear) then the above relationship does not hold. If two fertilizer rates were applied, one ΔN below the average, N_0 and the other ΔN above, then the average yield would be less, becoming the average obtained from the two different fertilizer rates. The loss in yield is shown by the quantity a , in Figure 2 (Jensen and Pesek 1962). Further discussion on the efficiency of fertilizer use is given in the paper by Jensen and Pesek 1962.

An experiment is to be set out to determine nutrient variation in the soil and yield response patterns as a result of the N P fertilizer distribution.

JENSEN, D. and PESEK, J. 1962. Inefficiency of fertilizer use resulting from nonuniform spatial distribution: I Theory. Soil Sci. Soc. Am. Proc. 26: 170-173.

LUTZ, J.A.; JONES, G.P.; HAWKINS, G.W. and HUTCHESON, T.G., Jr. 1975. Effects of uneven spreading of fertilizer on crop yields. Agron. J. 67: 526-529.

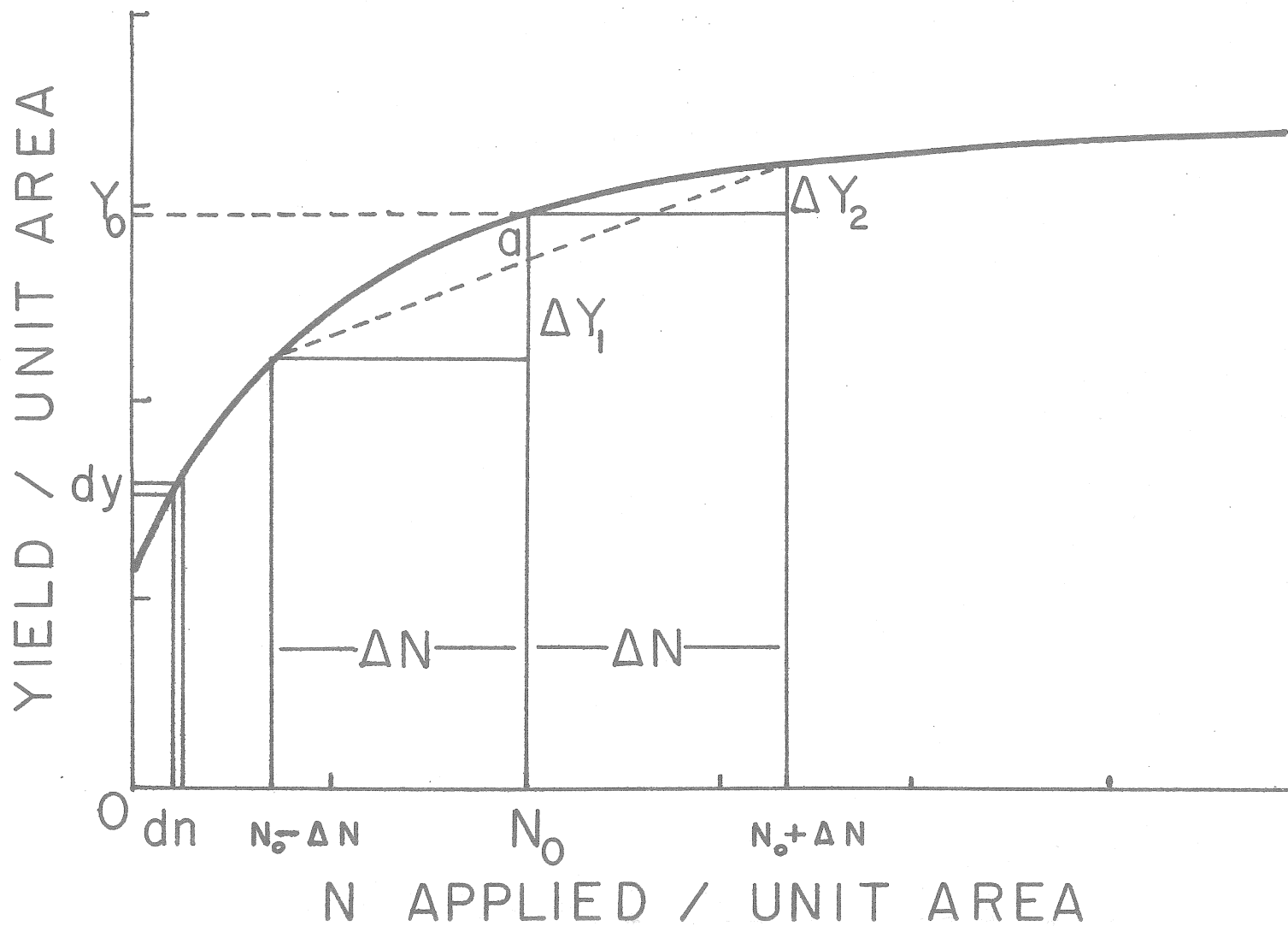


Figure 2. Relative yield increment of ΔY_2 and yield decrement ΔY_1 , resulting from different rates of N. a is the loss in yield due to the rate difference.