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**THE EFFECT OF NITROGEN,FUNGICIDE,TIME AND  
METHOD OF HARVEST ON SEED QUALITY IN SUPER  
SWEETCORN.(*Zea mays* L.) cv.ILLINI GOLD**

A thesis presented in partial fulfilment  
of the requirements for the  
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## Abstract

Super sweetcorn (*Zea mays* L.) poses problems for seed production, because the high seed sugar levels delay seed drying, which means harvest delays and the encouragement of pathogen invasion. These factors reduce seed quality, particularly germination and vigour. In a field experiment at Massey University in the 1994/95 season, the effects of fungicide application, nitrogen fertiliser application rate and time and method of harvest on seed quality and particularly seed vigour of super sweetcorn cv. Illini Gold were investigated.

The experiment used a randomised split-split plot design with four replicates of each treatment. Individual plot size was 3.25m x 4.75m. Seeds were hand sown on 25 November 1995 at a spacing of 75 cm between rows and 25 cm between seeds within the row. Treatments were nitrogen (0, 100, 200 kg N/ha as urea) applied in three split side dressing (15 days after sowing, 50 days after emergence and 30 days after silking) and a fungicide (Sportak 45 EC, 0 and 37 g a.i./ha) applied at tasselling, again during early cob development, and again at seed physiological maturity. Each treatment was split into six sub-plots for hand and machine (stationary thresher) harvest at 35%, 25% and 15% seed moisture content (SMC). At each harvest, 30 cobs were picked per sub plot and 15 were then hand shelled, while 15 were fed into an Almaco STB stationary thresher running at a speed of 396 rpm. Threshed seeds were then ambient air dried to 12% SMC.

Fungicide application failed to control *Fusarium* spp., and these fungi were recovered from 73-88% of the seeds depending on treatment. Because of this fungal infection, the highest germination recorded was 68% (for hand harvesting at

35%SMC), while the lowest was 48% (for machine harvest at 15% SMC). Abnormal seedlings resulting from *Fusarium* induced lesions averaged 25%, and from 10-15% of seeds were dead. *Fusarium* infection level increased and seed quality decreased as harvest was delayed from 35% SMC to 15% SMC. Seed quality (germination and vigour) was greater for hand harvested seeds than machine harvested seeds, as machine harvesting cracked seeds and lead to physical and physiological damage which nearly doubled the percentage of dead seeds. Seed quality did not differ for harvests at 25 and 35% SMC.

Nitrogen application increased the seed nitrogen content and thousand seed weight significantly, but had no effect on the seed vigour parameters recorded, including conductivity and seedling growth. Accelerated ageing vigour test results were confounded by the presence of *Fusarium* fungi, but whether these pathogens affected conductivity results could not be determined. Because of the effects of the *Fusarium* fungi, the hypothesis that the increasing availability of nitrogen would improve cell membrane integrity and therefore increase seed vigour could not be assessed. Effective control strategies for *Fusarium* spp. must be implemented before this hypothesis can be fairly tested in the future.

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