



Fig. 2. The relationship of % white values of blended and centrifuged sweet corn kernels to % moisture.

observed and calculated values showed this to be true of all 6 cultivars with an average difference of 2.3 % points.

This difference is thought to be associated with the effect of moisture stress in the kernels. Huelsen (6)

reported that the occurrence of a sudden shower may result in a moisture reading 2 to 3% higher than expected. The author has observed similar results in his own plantings. Huelsen also states that rain results in a decrease in soluble

solids. It seems likely that all the tests suggested so far in which the determination is made on a wet wt basis are subject to this error. If, however, the effects of moisture stress are uniform throughout the kernel, the % white test should not be affected. The discrepancy between the % moisture and % white tests in plantings 1 and 2 could be explained on this basis if planting 1 was under a lower moisture stress than planting 2. This is indicated by the fact that during the 15 day harvest period in planting 1 a total rainfall was 13.7 cm (5.6 inch). The same value for planting 2 was only 1.4. This independence from variation in moisture stress may represent a distinct advantage of the % white test.

#### Literature Cited

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## A New Inbred with High Sugar Content in Sweet Corn<sup>1</sup>

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**Abstract.** A new inbred, Illinois 677a, was found to have as high a sugar content as the *sh<sub>2</sub>* genotype, and both had twice as much sugar as 3 commercial *su<sub>1</sub>* cultivars when compared at the eating stage.

High levels of sugar and water soluble polysaccharides (WSP) are important factors of quality in sweet corn, with the sugars affecting sweetness and WSP affecting texture (4). Recessive genes such as *ae*, *du*, *sh<sub>2</sub>*, *su<sub>1</sub>* (standard sweet corn), and *su<sub>2</sub>* are known to increase the sugar content of corn at the eating stage. Further increases of sugar content can be achieved with genetic combinations such as *ae du wx*, *ae su<sub>2</sub>*, *sh<sub>2</sub> su<sub>1</sub>*, and *du sh<sub>2</sub>* (1, 2).

The genotype *sh<sub>2</sub>*, although possessing the highest sugar content of

single alleles, does not produce an appreciable amount of WSP. In contrast, typical *su<sub>1</sub>* genotypes have a desirable WSP content but produce less sugar than *sh<sub>2</sub>* (1).

The Illinois Agricultural Experimental Station has developed and released a *su<sub>1</sub>* inbred, Illinois 677a, that has been shown in preliminary studies to have as high a sugar content as *sh<sub>2</sub>* (3). This inbred came from a 3-way cross: (Bolivia 1035 x Illinois 44b) x Illinois 442a. Bolivia 1035 is an interlocking flour corn; Illinois 44b and Illinois 442a are both *su<sub>1</sub>* inbreds.

Illinois 677a tastes sweeter and has been found to remain tender and edible for a longer period of time than most commercial cultivars (A. M. Rhodes, unpublished observations).

In 1972, a study was conducted to compare the sugar content of Illinois 677a with 4 commercial cultivars: 'Illini Xtra-Sweet' (*sh<sub>2</sub>*), 'Victory Golden' (*su<sub>1</sub>*), 'Golden Cross' (*su<sub>1</sub>*), and 'Early

Sunglow' (*su<sub>1</sub>*).

Three self-pollinated ears for the 5 genotypes were harvested at 4 stages of kernel development: 18, 22, 26 and 30 days after pollination (DAP). At harvest, the ears were rapidly cleaned of husks and silk, frozen with liquid nitrogen, and stored at -15°C until used.

For sugar analysis, 20 g of frozen kernels from the middle section of the ear were put into 100 ml of boiling 80% ethanol (v/v) and ground for 1 min in a Servall Omni-mixer (16,000 rev/min, normal load). The homogenate was centrifuged at 39,000 g for 5 min. The pellet was resuspended with 100 ml of boiling 80% ethanol, centrifuged again, and the 2 supernatants were mixed and taken to volume. Sugar determinations were made in these combined supernatants. Preliminary experiments established that 2 ethanol extractions were enough to obtain 98-99% of the alcohol soluble sugars. Total sugars were determined with the anthrone procedure (5).

Total sugars at different stages of kernel development are shown for the 5 genotypes in Fig. 1. From 19 to 27 DAP, the sugar content of Illinois 677a is similar to that of the *sh<sub>2</sub>* line, 'Illini Xtra-Sweet', and both show about twice the sugar content of 'Victory Golden', 'Golden Cross', and 'Early Sunglow'. At about 31 DAP, the total sugar content

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