

## Key Facts about Sweet Corn Production

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Sweet corn was our family's weakness. We were prepared to resist atheistic communism, immoral Hollywood, hard liquor, gambling and dancing, smoking, fornication, but if Satan had come around with sweet corn we at least would have listened to what he had to sell.

-- Garrison Keillor in *Leaving Home*

Growing, handling practices affect crop yield and quality. Build recommendations to optimize both.



## Key Facts about Sweet Corn Production

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## Corn Genetics

- corn classified by storage carbohydrates (sugar, starch) in kernel

## Corn Genetics

Five major classes ...

- ... pop
- ... flint
- ... dent
- ... flour
- ... sweet (sugary)

## Sweet Corn Genetics

- SU ...
  - ... 1,550-year history
  - ... basis of N. American sweet corn
  - ... common in processed products
  - ... noted for creamy texture, rich, corny taste

## Sweet Corn Genetics

- se ...
  - ... probably derived from heirloom "Narrow Grained Evergreen"
  - ... properly cooled and refrigerated, can hold sweetness for two weeks after harvest

## Sweet Corn Genetics

- sh<sub>2</sub> ...
  - ... major mutation reduces kernel carbohydrate complexity
  - ... slows sugar-starch conversion, facilitating lengthy shipping
  - ... not one of the historic corn types, developed by geneticists



R3 - milk stage

## Sweet Corn Genetics

- "sweet" based on three major platforms ...
  - ... SU | long-standing,
  - ... se | naturally-occurring changes
  - ... sh<sub>2</sub> | recent, created change

## Sweet Corn Genetics

- newest varieties ...
  - ... combine two or more major platforms
  - ... blur traditional distinctions
  - ... compromise grower, eater traits
  - ... can require more preparation

### Key Facts about Sweet Corn Production

1. diverse markets, scenarios
2. resource-intensive
3. potentially high value
4. consumer/quality-driven

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### Sweet Corn Markets and Sectors

Processing      Fresh

### Sweet Corn Markets and Sectors

#### Processing

- regional (plant)
- contract
- coordinated management (including variety selection) and machine harvest
- often not irrigated
- largest acreage

### Sweet Corn Markets and Sectors

#### Fresh

- widely distributed
- contract, open
- variable acreage, field size
- hand, machine harvest
- wholesale-retail/direct, local-distant markets (competitive)
- often irrigated

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## Sweet Corn Production Costs

### Data

- CA, MI, OH, KY, PA, NC, MD
- 10 estimates 1996-2008
- fresh market
- machine, hand harvest

\$852 - \$2902 (avg. \$1421) / A

## Sweet Corn Production Costs

### Data

- CA, MI, OH, KY, PA, NC, MD
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Beyond land -- labor, chemical, fertilizer, irrigation, marketing costs highest.

## Major Sweet Corn Production Steps

- prepare land
- cultivate
- irrigate
- harvest
- deliver-ship
- plant
- spray
- fertilize
- pack
- market

others: install plastic, thin

# Major Examples

(CCA may provide input)



## Managing Sweet Corn Crop Quality Variety Selection and Management

... see extension reports,  
seed company people,  
other farmers and  
other sources  
of information

## Sweet Corn Yield and Quality Genotype Isolation

- time ... days to flower (tassel-silk)
- space ... separate from
  - A. se ... field corn
  - B. sh<sub>2</sub> ... field and other types of sweet corn
  - C. new "mixed" endosperm ... variable, consult seed dealer

## Mixed Plantings of Sweet Corn of Varying Endosperm Genetics

	su	se, SE, EH	Syn.	sh2	sh2 improved
Sugary (su)	OK	OK	OK	NO	NO
Sugar-enhanced (se, SE, EH)	OK	OK	OK	NO	NO
Synergistic, Triplesweet	OK	OK	OK	NO	NO
Supersweet (sh2)	NO	NO	NO	OK	OK
Improved supersweet (Gourmet Sweet, Extra Tender)	NO	NO	NO	OK	OK

image courtesy L. Maynard, Purdue Univ.

## Sweet Corn Yield and Quality Seed and Sowing



image courtesy Delta Farm Press



image courtesy Univ. NE-L



image courtesy Hunter Brothers Farm

Special care with seed placement, seedling protection may be needed.

image courtesy ISU Extension



Vegetative Phase

- Planting
- Emergence
- End of photoperiod insensitive (Juvenile) phase
- Tassel Initiation

Reproductive Phase

- Tassel Initiation
- Last leaf appearance
- Tassel emergence
- Silking
- Physiological Maturity

Image courtesy T. Tollenaar, Univ. Guelph

Image courtesy Iowa State Univ. Extension



Leaf curling  
due to low  
temperatures

IOWA STATE UNIVERSITY  
University Extension

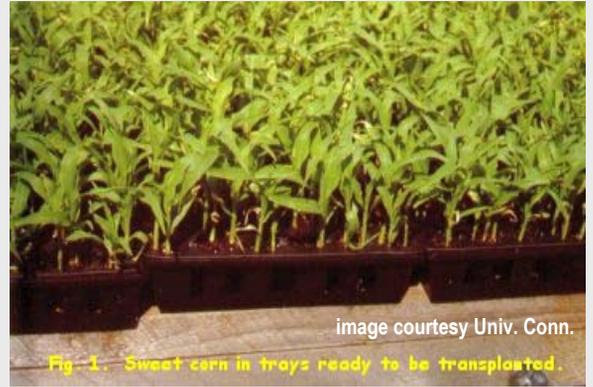


image courtesy Univ. Conn.

Fig. 1. Sweet corn in trays ready to be transplanted.



## Sweet Corn Yield and Quality Weed Control



Bernie Zandstra, MSU



Doug Doohan, The OSU

## Sweet Corn Weed Control Programs

- soil type
- rotation
- sweet corn variety
- weeds present
- season

courtesy B. Zandstra, MSU

## Sweet Corn Weed Control Programs

### • soil type

Light, sandy soil ...

- ... stunting possible with pre-plant, grass-control materials (e.g., Dual, Lasso, Outlook, Prowl)
- ... increases chance of carryover effects
- ... with high water table, may restrict atrazine use

courtesy B. Zandstra, MSU

## Sweet Corn Weed Control Programs

### • rotation

- avoid herbicides with long residuals, perhaps especially atrazine
- general rule: max of 1 lb ai atrazine before July 1 if soil contains at least 3% OM or 20% clay
- ... less OM or clay? Use less atrazine or use it pre-plant only

courtesy B. Zandstra, MSU

## Sweet Corn Weed Control Programs

### • sweet corn variety

- ... differ in herbicide tolerance, especially among sh<sub>2</sub>-type varieties
- ... sulfonyleurea materials problematic
- ... sensitive hybrids sometimes on label
- ... new materials possibly more challenging to use
- ... growers to accept responsibility

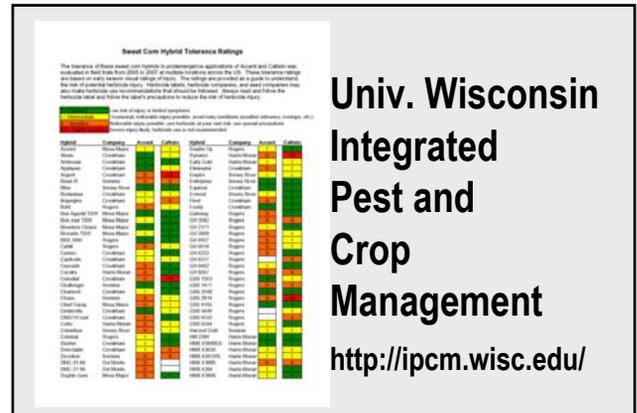
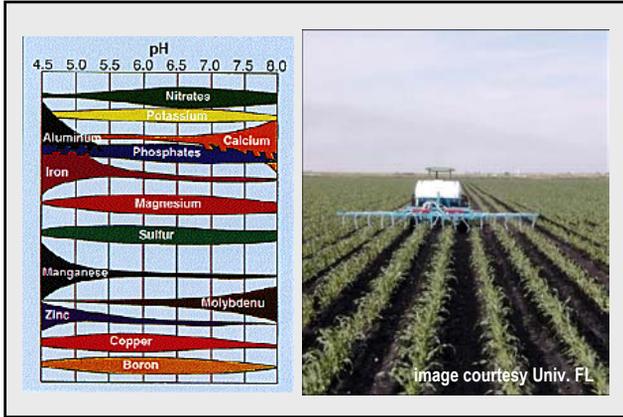


image courtesy D. Doohan, The OSU



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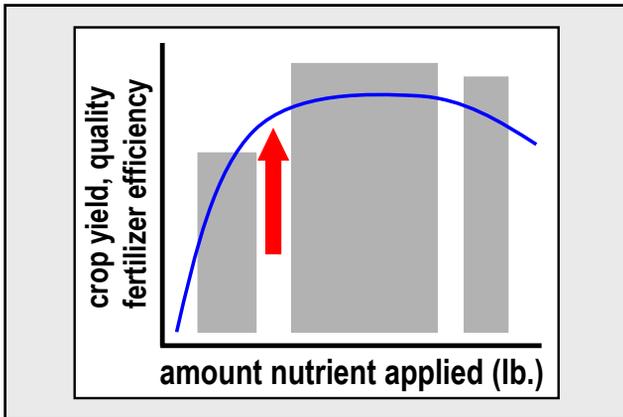
7/13/2006



### Sweet Corn Yield and Quality Fertilizer Program

- fertilizer (makeup, analysis)
- rate
- timing
- placement

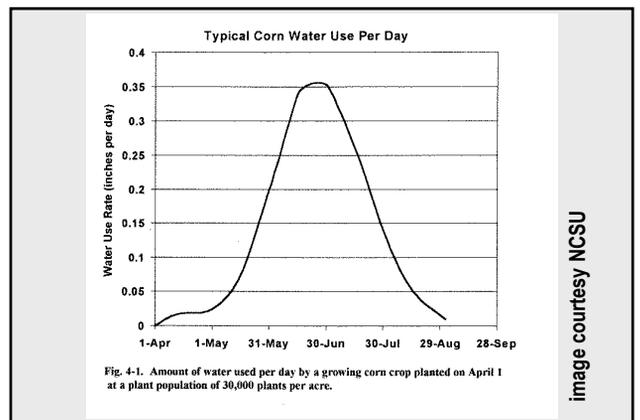
market, variety, irrigation, soil type, rotation

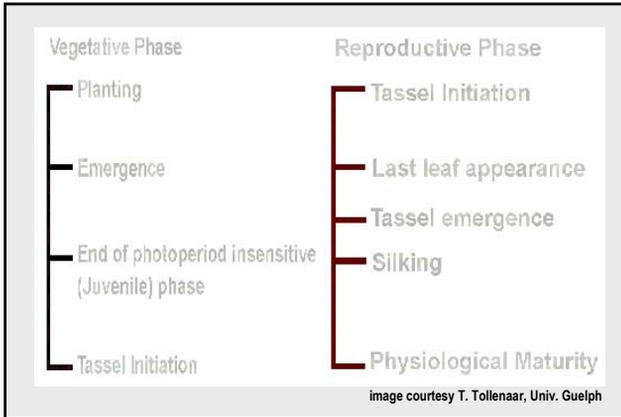


### Sweet Corn Yield and Quality Water Use / Irrigation

- ... may use 4-6 inches less total water than field corn in a season, but similar amounts under same conditions
- ... daily ET greatest tassel-harvest
- ... need for 0.25 inch per day x many days common

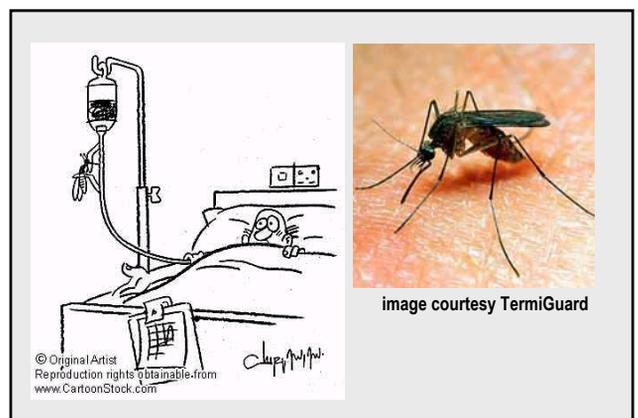
V. Fritz, C.B. Tong, C.J. Rosen, J.A. Wright; UMN





**Sweet Corn Yield and Quality**  
**Water Use / Irrigation**

- reports vary with regard to the influence of soil moisture on sweet corn crop quality
- deficits can reduce tipfill and ear length, at minimum





[Key Facts about Sweet Corn Production](#)

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2. resource-intensive
- 3. potentially high value**
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## Sweet Corn Profit Potential

$$117 \text{ cwt/A} \times \$20.83/\text{cwt} \\ = \$2437/\text{A gross}$$

source data: USDA, Extension

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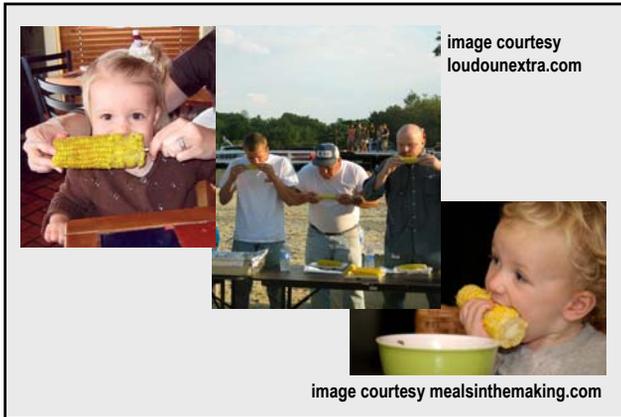
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## Sweet Corn Markets and Sectors

Processing      Fresh





## The Perfect Ear

**From an Average Consumer's Standpoint**



In most U.S. markets, consumers of fresh market sweet corn prefer an 8-9 inch ear with a dark green husk, long and dark green flag leaf, and 16 straight rows of small, deep, and sweet kernels filled to the tip of the ear.

Adapted from "Sweet Corn" by W.F. Tracy, In: Specialty Corns, 2nd ed., 2001, A.R. Hallauer, ed.

## How Buyers Rate Quality

- way it looks
  - initial purchase
- way it eats
  - repeat purchase




## Fresh Market Sweet Corn

### Buyer Rating ... Before Purchase

- husk and flag leaf color and length
- tip fill
- row number and configuration
  - ear uniformity
  - silk color



## (Fresh Market) Sweet Corn

### Buyer Rating ... After Purchase/Eating

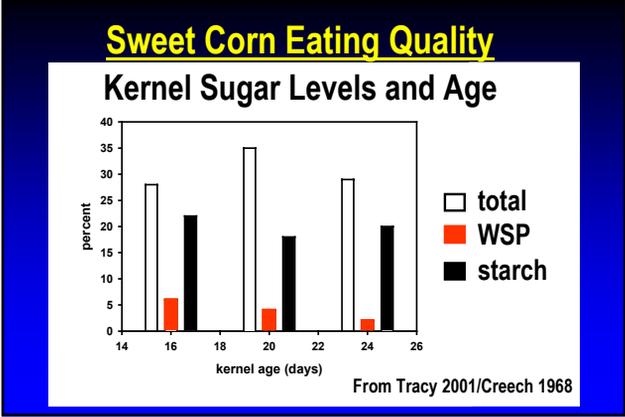
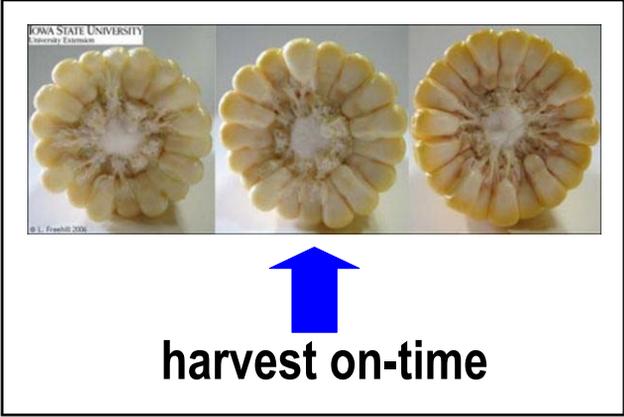
<ul style="list-style-type: none"> <li>✓ <b>flavor</b></li> <li>✓ <b>texture</b></li> <li>✓ <b>aroma</b></li> </ul>	<p>Shown in order of importance. Components known.</p>
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## Sweet Corn Eating Quality

### Components of Flavor

**Sweetness!**  
dominant component

Based primarily on levels of sucrose.



### Sweet Corn Eating Quality

#### Components of Texture

- pericarp tenderness
- phytyglycogen levels
- kernel moisture content

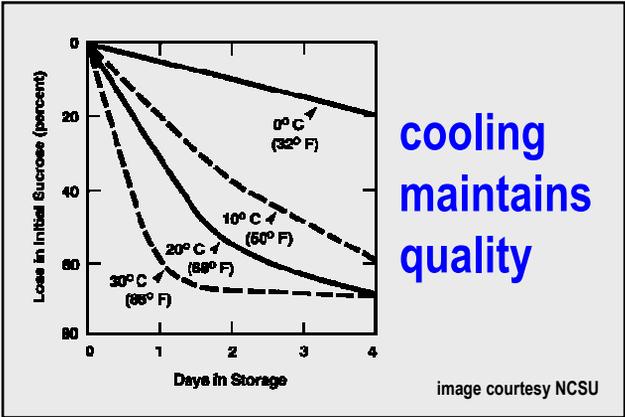
### Sweet Corn Eating Quality

#### Components of Aroma

- at least seven distinct aromas present
- dominant aroma based on dimethyl-sulfide
- aroma present only after heating -- keep this in mind when tasting corn

harvest in AM and/or remove field heat

hydrocooling key to many sweet corn growers



## Sweet Corn Eating Quality Kernel Sugar Levels and Storage Conditions

Hours after Harvest	Storage Temp (F)	----- percent dry weight -----		
		sucrose	WSP	starch
0	---	37	0.9	3
24	39	33	0.7	5
	81	29	0.8	5
48	39	31	0.7	6
	81	28	0.8	8
96	39	34	0.8	6
	81	14	0.6	10

From Tracy 2001/Garwood et al. 1976

# SUMMARY

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- spray
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- market

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image courtesy LA State Univ.

image courtesy Fulton Farms

**Management at each stage affects yield, quality.**

THANK-YOU  
and  
GOOD LUCK!



QUESTIONS?

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