



Edcot Gin – Edmonson, TX  
Phillip Kidd, Manager  
Landon Kidd, Assistant Manager  
(806) 864-3335

Tule Creek Gin – Tulia, TX  
Jaime Subealdeia, Manager  
(806) 627-4287

Lakeview Gin – Tulia, TX  
Joe Borchardt, Manager  
(806) 627-4227

Johnson Gin – Silverton, TX  
Daniel Jenkins, Manager  
(806) 823-2224



Top of Texas Gin – Hereford, TX  
Billy Sam Borchardt, Co-Manager  
Steven Birkenfeld, Co-Manager  
(806) 258-7466



Adobe Walls Gin – Spearman, TX  
Jerrell Key, Manager  
Doug Kennedy, Assistant Manager  
(806) 659-2574



Lonestar Gin – Pampa, TX  
Carey McKinney, Manager  
(806) 665-0677



## Cotton Insights Newsletter

A service provided by Windstar, Inc. affiliated gins.

July 14, 2023

Randy Boman, Ph.D.  
Windstar, Inc.  
Cotton Agronomics Manager  
(580) 481-4050  
rboman@windstarinc.com  
www.windstarinc.com

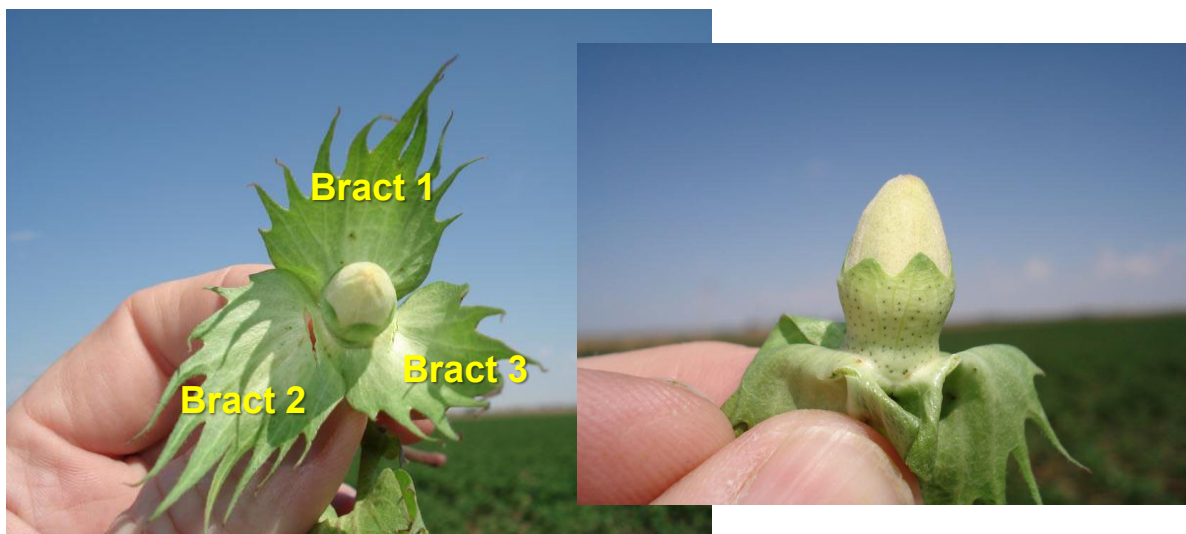
### 4-Bract Floral Anomalies Noted

During recent inspections of our surviving trials in both Texas and Oklahoma, I and others have found some floral anomalies called “4-bract squares.” Four-bract square initiation is poorly understood, but I have seen this many times during my career. I don’t like remembering 2011, but that year we experienced an excessive number of these types of square anomalies during the mega-heat. **There is a presence of this anomaly in surviving fields this year, but I am not greatly concerned because the incidence is very low.**

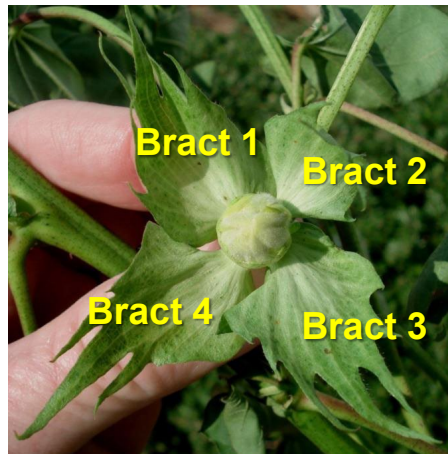
- The best published information I can find on this is in the vintage publication Cotton Physiology Today, Volume 4, Number 1 (1993). This publication can be accessed here: <https://www.cotton.org/tech/physiology/cpt/plantphysiology/upload/CPT-Jan93-REPOP.pdf>
- This publication states:
- *After the fruiting branch meristem forms the subtending leaf, it starts to form the bracts. High spring temperatures (average day/night temperature above 80 degrees) can cause this meristem to attempt to produce another leaf after the subtending leaf, but before the bracts are formed. This extra leaf forms a fourth "bract", and is located just outside the normal 3 bracts. The lowest fruiting branches appear most susceptible to 4-bract squares, because high temperatures later in the season do not have the same effect. Four-bract squares are more susceptible to shed and thrips injury - the fourth bract provides an opening for thrips to enter the young square - than well-developed 3-bract (normal) squares.*

- My experience with 4-bract squares is that this doesn't end well. Virtually all of these types of squares which have a tissue appendage on the floral dome (bud) will eventually abort.
- The 4-bract squares will usually be associated with the first and oldest squares. Initially, if 2-3 nodes of 4-bract squares are noted on the first few fruiting branches, these will no longer be found in younger fruit higher up the plant. It's almost as if the plant "gets accustomed to the heat" or perhaps the extreme temperatures are no longer encountered and subsequent squares are normal.
- When 4-bract squares are observed, many times the aborted squares found on the ground will have this condition.
- Four-bract squares WITHOUT any tissue appendage on the floral dome will many times set and make normal bolls, with the exception of having 4 bracts on the boll instead of the normal 3.
- In my opinion, the take-home-lesson is to recognize 4-bract squares, and don't confuse these as having been impacted by insect damage and start spraying insecticides for possible "stealth insect feeding." This just adds additional input costs and pyrethroid-based insecticides can trigger secondary pest outbreaks (such as aphids) if the beneficial arthropods are removed from the agroecosystem.
- **This is caused by a physiological phenomenon and is attributed to high heat when the first squares are forming in the terminal.**
- Photos below will provide some clarity to this situation.

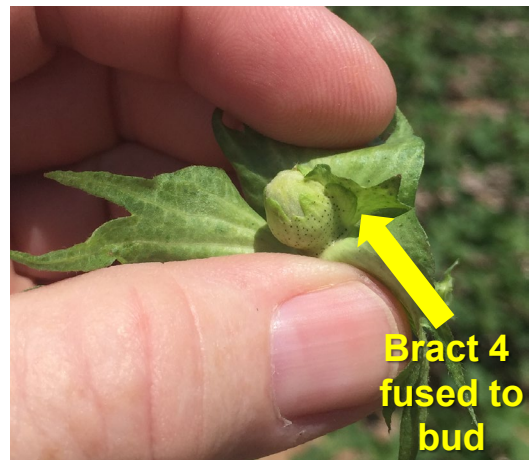
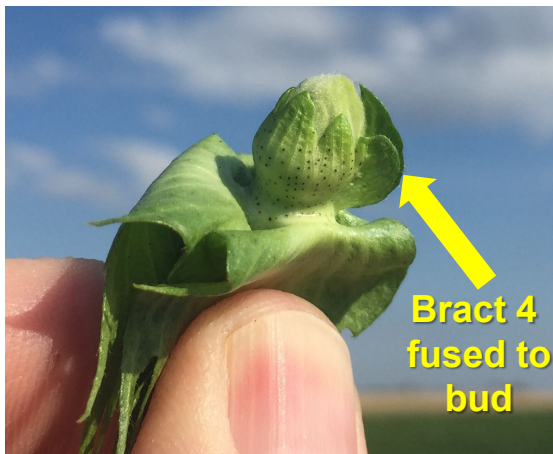
#### **Normal Square Development – Note 3 Bracts and Normal Floral Dome or Bud (Calyx and Petals Normal)**

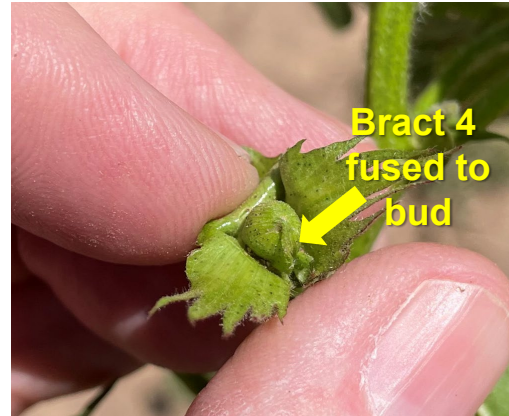


**“A Normal Square with 4-Bracts” (Note There Is No Tissue Appendage on Floral Dome)**



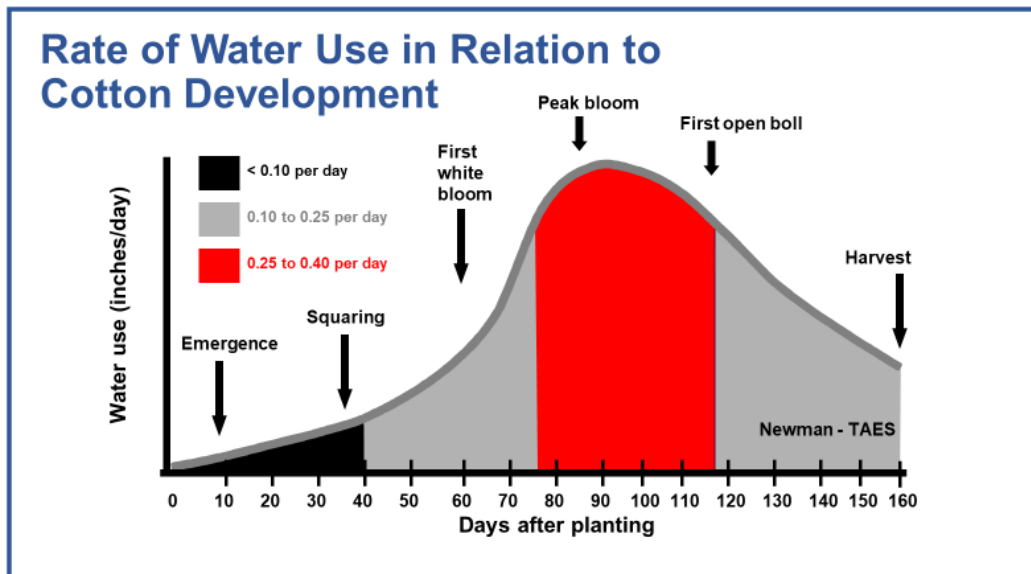
**Abnormal 4-Bract Squares (Note Presence of Tissue Appendage Fused to Floral Dome)**





## Irrigation Comments


Earlier planted cotton will be entering the bloom stage soon. That is the stage when cotton water demand increases considerably. The image below is a “vintage” cotton water consumption graphic , but it is still valuable.



## Irrigation Capacity and Amount of Evapotranspiration Replacement

A few years back I generated the following tables that show the amount of irrigation application that is possible for a 120-acre full pivot of cotton, and a 60-acre half pivot (other half pivot is fallow, so all water can be applied to one-half of the circle). These numbers are based on varying irrigation capacities and crop ET rates. The tables below also assume uninterrupted 24-hour pumping and delivery.

**120-acre pivot  
(assumes  
uninterrupted  
pumping)**

Amount of Cotton Evapotranspiration Replacement for Various 120-Acre Center Pivot Irrigation Pumping Capacities and Delivery Efficiencies												
GPM	Pumping capacity delivered to center pivot		Acre-inches/acre/day at 100% efficiency	Inches/acre/day delivered at irrigation application efficiency (%)			For 85% irrigation application efficiency					
	GPM/acre	Gallons/day		Acre-feet/day	Acre-inches/day	95 (LEPA, SDI)	85 (Low elevation spray)	75 (poor spray)	0.25 (moderate)	0.35 (high)	0.45 (very high)	0.55 (extreme)
100	0.8	144,000	0.44	5.3	0.04	0.04	0.04	0.03	15	11	8	7
200	1.7	288,000	0.88	10.6	0.09	0.08	0.08	0.07	30	21	17	14
300	2.5	432,000	1.33	15.9	0.13	0.13	0.11	0.10	45	32	25	20
400	3.3	576,000	1.77	21.2	0.18	0.17	0.15	0.13	60	43	33	27
500	4.2	720,000	2.21	26.5	0.22	0.21	0.19	0.17	75	54	42	34
600	5.0	864,000	2.65	31.8	0.27	0.25	0.23	0.20	90	64	50	41
700	5.8	1,008,000	3.09	37.1	0.31	0.29	0.26	0.23	105	75	58	48
800	6.7	1,152,000	3.53	42.4	0.35	0.34	0.30	0.27	120	86	67	55
900	7.5	1,296,000	3.98	47.7	0.40	0.38	0.34	0.30	135	97	75	61
1000	8.3	1,440,000	4.42	53.0	0.44	0.42	0.38	0.33	150	107	83	68
Note: 12 acre inches = 1 acre-ft = ~326,000 gallons												
Texas High Plains research indicates that ~75% ET replacement can generally maximize water-use efficiency (lbs of lint/inch of water) but not necessarily total yield/acre. Salinity will complicate this response.												
<div><div>WINDSTAR GINS</div><div>Provided by Dr. Randy Boman Cotton Agronomics Manager Windstar, Inc.</div></div>												

60-acre one-half circle  
of cotton, other half  
fallow

(assumes  
uninterrupted  
pumping)

Amount of Cotton Evapotranspiration Replacement for Various 60-Acre Center Pivot Irrigation Pumping Capacities and Delivery Efficiencies											
GPM	Pumping capacity delivered to center pivot GPM/acre	Gallons/day	Acre-feet/day	Acre-inches/day	Acre-inches/acre/day at 100% efficiency	Inches/acre/day delivered at irrigation application efficiency (%)			For 85% irrigation application efficiency % ET replacement if actual crop ET (in inches/day) is:		
						95 (LEPA, SDI)	85 (Low elevation spray)	75 (Poor spray)	0.25 (moderate)	0.35 (high)	0.45 (very high) 0.55 (extreme)
100	1.7	144,000	0.44	5.3	0.09	0.08	0.08	0.07	30	21	17
200	3.3	288,000	0.88	10.6	0.18	0.17	0.15	0.13	60	43	33
300	5.0	432,000	1.33	15.9	0.27	0.25	0.23	0.20	90	64	50
400	6.7	576,000	1.77	21.2	0.35	0.34	0.30	0.27	120	86	67
500	8.3	720,000	2.21	26.5	0.44	0.42	0.38	0.33	150	107	83
600	10.0	864,000	2.65	31.8	0.53	0.50	0.45	0.40	180	129	100
700	11.7	1,008,000	3.09	37.1	0.62	0.59	0.53	0.46	210	150	117
800	13.3	1,152,000	3.53	42.4	0.71	0.67	0.60	0.53	240	172	133
900	15.0	1,296,000	3.98	47.7	0.80	0.76	0.68	0.60	270	193	150
1000	16.7	1,440,000	4.42	53.0	0.88	0.84	0.75	0.66	300	215	167
Note: 12 acre inches = 1 acre-ft = ~326,000 gallons											
Texas High Plains research indicates that ~75% ET replacement can generally maximize water-use efficiency (lbs of lint/inch of water) but not necessarily total yield/acre. Salinity will complicate this response.											
 <b>WINDSTAR GINS</b> Provided by Dr. Randy Boman Cotton Agronomics Manager Windstar, Inc.											