# Monitoring Cotton Growth and Development in the Texas Panhandle

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Target Development Curve

- Representative of a hypothetical normal non-stressed cotton crop (Bourland et al., 2008).

- TDC is not an accurate model for cultivars under stress (Oosterhuis et al., 2008b).

- Monitoring main stem nodal development is a proven appraisal of the status of growth – specifically early season vegetative growth (Bourland et al., 2008, 1992).

- Current standard for identifying the flowering date for cutout is NAWF=5 (Bourland et al., 1992).
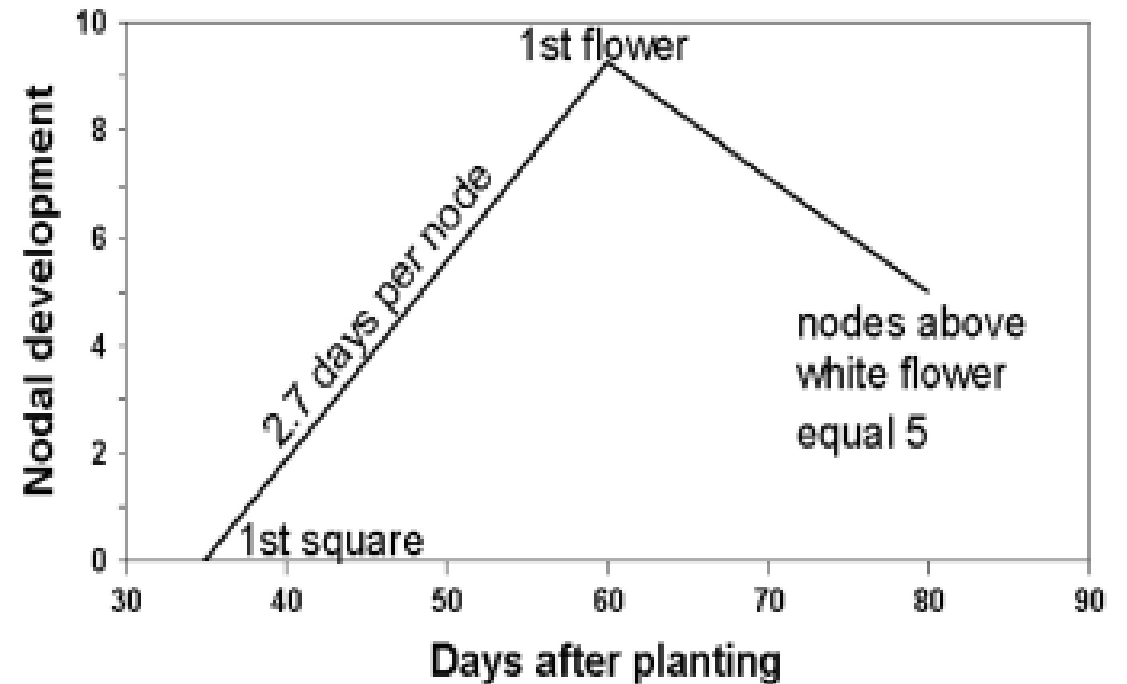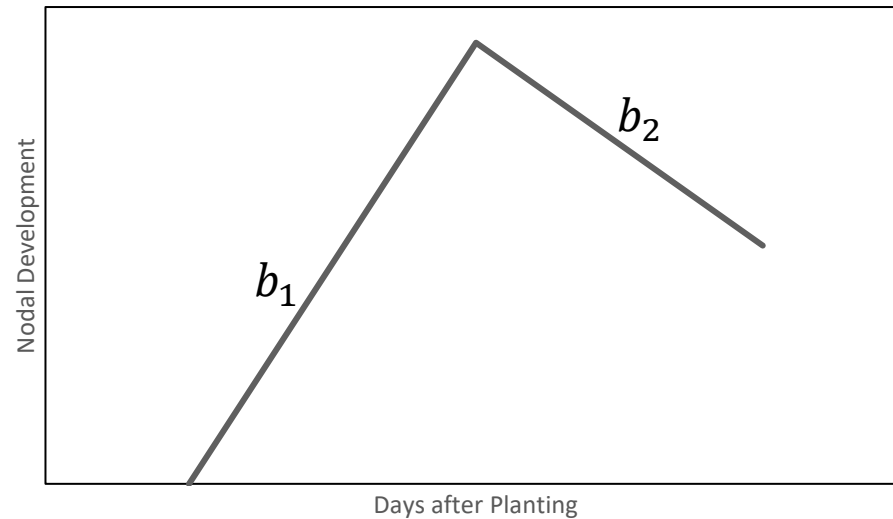
2022 WCC Analysis

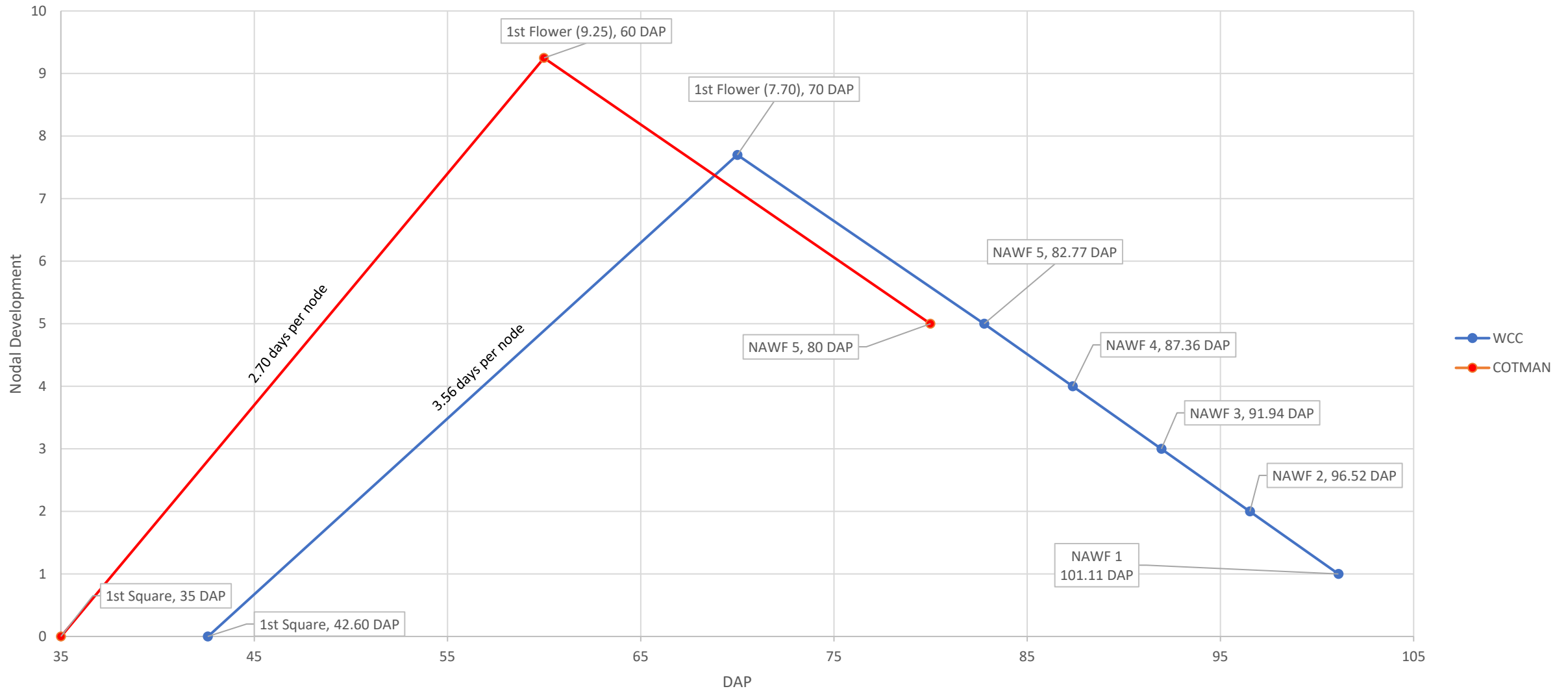General Equation: $NAWF = b_0 \pm b_1(DAP)$

$$NAWF = \begin{cases} f(DAP)b_1 + \epsilon \\ f(DAP)b_2 + \epsilon \end{cases}$$

Slope	Inflection Point (DAP)	Intercept	DAP	Nodal Development (days/node)	1st Square (DAP)	1st Flower (DAP)	1st Flower (NAWF)	NAWF=5 (DAP)	NAWF=4 (DAP)	NAWF=3 (DAP)	NAWF=2 (DAP)	NAWF=1 (DAP)
b1	<70	-11.97	0.28	3.56	42.60	70	7.70	82.77	87.36	91.94	96.52	101.11
b2	>=70	23.06	-0.22	-4.58								

Nodal Development

b_2

b_1

Days after Planting

2022 WCC Development Curve

2022 Etter, Texas (WCC)

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WCC Lint Accumulation

Table 8. WCC - Logistic model estimates

	Y_{max} (g/m²)	Node$_0$	K
2022	98.82	10.67	0.56
Confidence Interval	[94.88, 103.35]	10.43, 10.94	[0.50, 0.61]
2023	107.99	11.06	0.56
Confidence Interval	[102.26, 114.88]	[10.75, 11.42]	[0.49, 0.65]

Table 9. WCC - Results of nonlinear regression estimations with corresponding NAWF values and identification of last effective flower population

Main-Stem Node	Average NAWF Value		Accumulated Yield (g/m²)		% Max Yield	
	2022	2023	2022	2023	2022	2023
21	5.00	-	98.52	107.58	99.69%	99.62%
20	-	-	98.29	107.27	99.46%	99.33%
19	-	-	97.90	106.74	99.07%	98.84%
18	4.00	-	97.22	105.82	98.38%	97.99%
17	3.10	4.00	96.05	104.25	97.19%	96.53%
16	3.30	3.60	94.07	101.60	95.19%	94.08%
15	3.50	3.00	90.79	97.28	91.87%	90.08%
14	4.00	3.30	85.56	90.54	86.59%	83.84%
13	4.30	3.80	77.74	80.74	78.66%	74.77%
12	4.70	4.00	67.00	67.89	67.80%	62.86%
11	5.10	4.40	53.96	53.09	54.61%	49.16%
10	5.20	4.80	40.25	38.42	40.73%	35.58%
9	5.60	5.00	27.85	25.90	28.19%	23.98%
8	5.50	5.40	18.10	16.49	18.31%	15.27%
7	6.00	5.60	11.22	10.08	11.35%	9.33%
6	9.00	5.30	6.74	6.00	6.82%	5.55%
5	-	7.00	3.96	3.51	4.01%	3.25%
4	-	-	2.30	2.03	2.33%	1.88%

What's next?

- <u>Current work</u>: Better understanding of cotton crop development and progression to maturity
- <u>Current work</u>: Better understanding of physiological cutout
- <u>Future work</u>: Heat units and days to mature last effective fruiting positions i.e. boll maturation trial
- <u>Future work</u>: Need to understand seasonal cutout as it related to cotton
- This information is needed to manage for earliness