Lygus Chemical Control Termination Guidelines

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Like determining the last flower that can be safely taken to harvest as a mature boll, making the best decisions about when to stop insect chemical controls is knowledge intensive. With sufficient knowledge about your specific situation, sound decisions can be made about when to cease chemical controls for *Lygus* bugs. These draft guidelines are based in 4 years of replicated research and limited validation on grower fields. They should help facilitate the grower – PCA dialog that is needed to arrive at the best decision for each individual grower's set of production conditions.

Thresholds for *Lygus* bugs in cotton have been well-established for years and validated on commercial acreages in Arizona. When a field has reached a minimum threshold density of 15 total *Lygus* with 4 nymphs per 100 sweeps (15\4) during the peak flowering period, a spray should be made and should return more than the cost of that spray to the grower in yield protected. Certain conditions (e.g., ample natural enemies) permit initial action thresholds of up to 15\8. However as a crop slows in growth and blooming rates decline, the amount of yield that can be saved by any given *Lygus* spray is reduced, to a point of diminishing returns. These guidelines are designed to help a grower and PCA decide when the final *Lygus* control should be made to give the best economic return. A grower and PCA will need to know at least four things before they can make this decision properly:

1) The maturity class of the variety in use (early, medium, or full-season),
2) The planting date (optimal, e.g., April for central AZ, vs. late, e.g., May),
3) The production goals with respect to irrigation termination timing relative to the primary fruiting cycle. "Optimal" irrigation termination is timed to grow and mature the primary fruit set only. Some growers elect to extend irrigations for a variety of reasons. So "later" irrigation termination timing usually consists of one or two additional irrigations beyond that necessary to mature the primary fruit set. And,
4) The cotton development as measured by nodes above white flower (NAWF) counts.

These guidelines are shown on the reverse side for a specific economic situation (75 cent cotton). Determine which production scenario (maturity class, planting date, and irrigation termination timing) best fits your situation. Then make your last spray, if *Lygus* thresholds are exceeded, when your revenue is significantly increased (as indicated by the green $ sign). This is your *Lygus* control termination point (LT). A table is provided below showing the average number of sprays needed to for each LT from our research. This can give some idea of the number of sprays needed to reach LT decision by looking at the difference between successive timings (e.g., LT3 – LT2).

Variety	Irrigation Termination	Optimal Planting Date				Late Planting Date			
		LT1	LT2	LT3	LT4	LT1	LT2	LT3	LT4
Early	Later	0	1	1.7	3.3	0	1.3	2.7	3.3
Early	Optimal	0	1	1.7	3.0	0	1.3	2.7	3.3
Medium	Later	0	1	2.3	3.3	0	1.3	2.7	3.7
Medium	Optimal	0	1	2.3	3.3	0	1.3	2.7	3.7
Full	Later	0	1	2.3	4.3	0	1.7	3.0	4.0
Full	Optimal	0	1	2.3	4.0	0	1.7	3.0	4.0

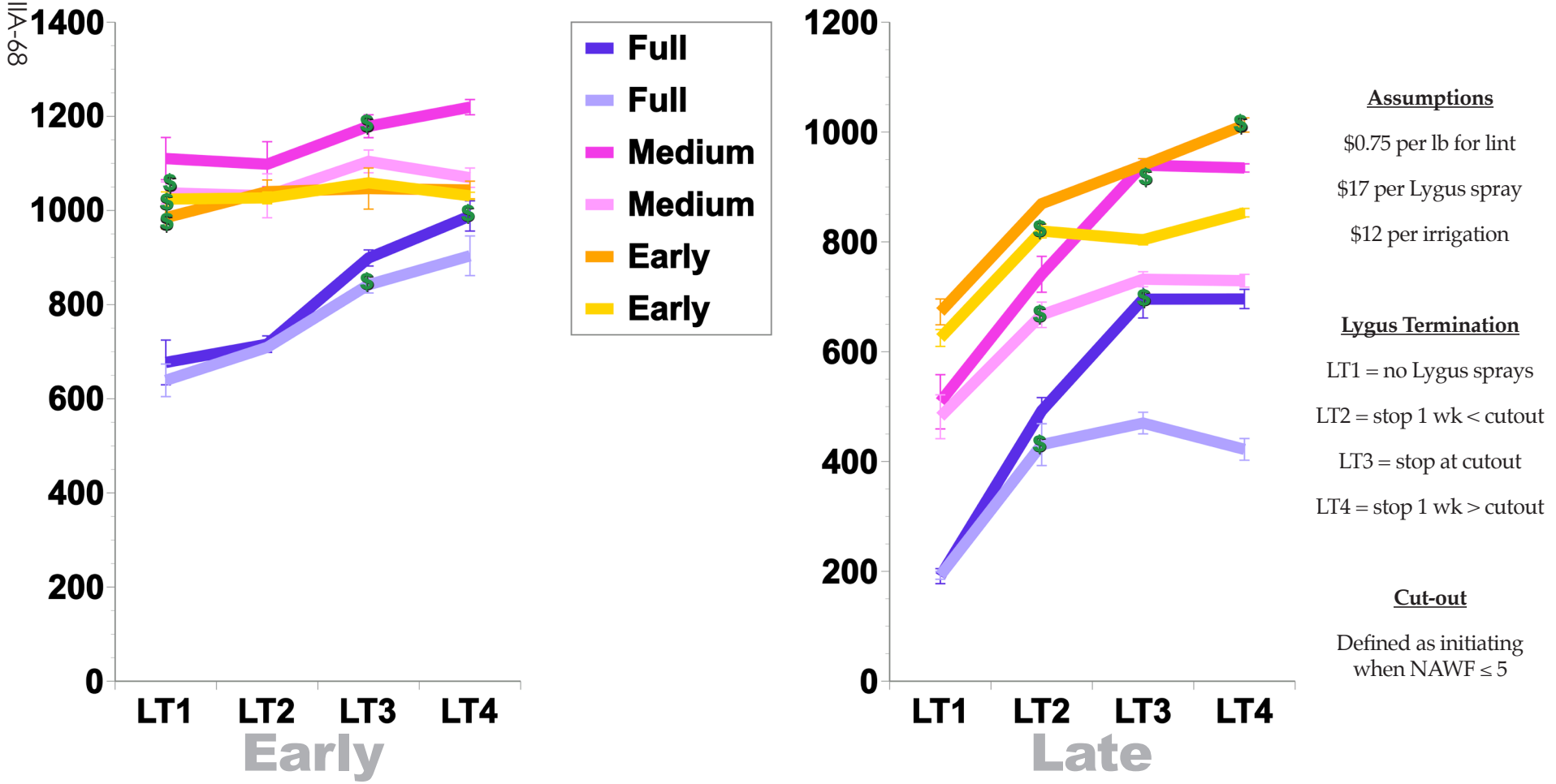

Plate 55. Lygus chemical control termination (LT) timing guidelines and gross revenues ($/A) for 3 cotton maturity groups, 2 irrigation terminations (lighter shade = optimal termination; darker shades = later), and planting dates (early on left; late on right). Gross revenues assume cotton lint at $0.75/lb, $17/Lygus spray, and $12/late season irrigation. LT1 = no sprays made for Lygus control, LT2 = last spray at about 1 week prior to initiation of cut-out (NAWF = 5), LT3 = last spray at initiation of cut-out, and LT4 = last spray about 1 week after initiation of cut-out. $ indicates maximum significant increase in gross revenue for a given production scenario (line). E.g., for a medium maturity variety (purple) planted late (right) terminating irrigations optimally (lighter purple), should cease Lygus controls at LT2 (ca. 1 week before cutout) for maximum revenue. Additional sprays (to LT3 or LT4) did not produce significant increases in gross revenue. However, a grower terminating irrigations later (darker purple) should have extended Lygus chemical controls to LT3 (ca. at cut-out) in order to achieve the maximum economic outcome. The relationship among factors (variety, planting date, and irrigation termination) is complex. A PCA should know the production constraints and goals of the grower. All scenarios assume there are threshold level Lygus present (15:4), but not all scenarios require treatment for maximum economic return. E.g., early maturing varieties (orange) planted early (left) were able to avoid significant losses to Lygus and no sprays were needed.