Ratoon Cropping Mechanically Harvested Lima Bean Is Possible in the Southern Piedmont

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Lima bean *(Phaseolus lunatus* L.) is well adapted to the environmental and edaphic conditions of the southeastern United States (Alexander et al., 1984; McLaurin et al., 1983). The crop maintains productivity under high temperature (Smittle, 1986), so continuous production and harvest from early July through late September is possible. Mechanical harvesters make commercial production of 5 to 10 ha of fresh-market lima bean economically feasible. Bean stubble remaining after mechanical harvest initiates new growth, so we decided to investigate the potential for producing a ratoon crop from stubble after harvest.

Four lima bean cultivars (Table 1) were planted in a field of Cecil sandy loam (clayey kaolinitic thermic Typic Hapludult) on 24 Apr. 1990. Preplant fertilization consisted of (kg·ha^{-1}) 58N, 26P, and 48K 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-l-methylethyl)acetamide (metolachlor) at 1.68 kg·ha^{-1} was applied pre-emergence. Rainfall was supplemented with sprinkler irrigation to supply ≈40 mm water/week. The design was a strip-split block with two replications; three harvest date subplots (four rows each) and two sidedress subplots (0 or 30 kg N/ha as ammonium nitrate) were stripped across cultivar main plots that were 12 rows wide (80 cm between rows) and 48 m long. Sidedress treatments were applied 23 May. Harvest data were collected from 24 m of the two inner rows of harvest date × sidedress subplots using a single-row mechanical harvester (Pixall Corp., Clear Lake, Wis.). The seed crop was harvested on 9, 12, and 16 July (76 to 83 days after sowing). On 17 July, stubble was rotary-mowed to ≈ 10-cm height. Sidedress treatments were repeated on 19 July. The ratoon crop was harvested on 13, 17, and 20 Sept. (58 to 65 days after mowing).

For the present purposes, harvest dates are treated as multiple observations and are not analyzed as a separate treatment effect. Sidedress treatments are combined since analysis of variance revealed no significant N sidedress effect. Cultivar effects were significant only in the ratoon crop (Table 1). The ratoon crop yield ranged from 7% lower to 105% higher than the seed crop yield, depending on cultivar (Table 1). Yields in both crops were relatively low compared with local commercial yields of 2500 kg·ha^{-1}. 'Thorogreen' appeared to be less tolerant of mowing, resulting in loss of stand. Although excessive weed pressure and loss of stand in 1991 preclude statistical analysis, subsequent observations confirm that 'Thorogreen' did not perform well in ratoon cropping with yield averaging 774 kg·ha^{-1}, whereas yields were acceptable for 'Dixie Butterpea' (1129 kg·ha^{-1}), 'Jackson Wonder' (2235 kg·ha^{-1}), and 'Eastland' (1528 kg·ha^{-1}).

We estimate that ratoon cropping shortened the production interval by 2 to 3 weeks compared with replanting. Uneven maturity made timing the ratoon crop harvest difficult. Late-season weed pressure and loss of stand following the initial harvest were the primary constraints to ratoon production. Pod appearance was reduced by disease (common blight or anthracnose), but the quality of shelled beans was acceptable. These preliminary results demonstrate the horticultural potential for ratoon cropping lima bean where the growing season is sufficiently long.

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Table 1. Yield of four ratoon-cropped lima bean cultivars averaged across harvest date and N sidedress treatment.

Cultivar	Seed crop	Ratoon crop
	kg·ha^{-1}	
Dixie Butterpea	1330 a[z]	2720 a
Jackson Wonder	1010 a	1660 b
Eastland	1010 a	1320 bc
Thorogreen	1110 a	1030 c

[z]Mean separation within crop by Duncan's multiple range test at $P = 0.05$. Crop × cultivar interaction is significant at $P = 0.01$.

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