Clean Chip Residual Amended with Composted Poultry Litter as a Substrate for *Lantana camara*

*C.R. Boyer[1], C.H. Gilliam[1], G.B. Fain[2], T.V. Gallagher[3], H.A. Torbert[4], and J.L. Sibley[1]

[1]Auburn University, Department of Horticulture, Auburn, AL 36849
[2]USDA-ARS Southern Horticultural Laboratory, Poplarville, MS 39470
[3]Auburn University, School of Forestry & Wildlife Sciences, Auburn, AL 36849
[4] USDA-ARS National Soil Dynamics Laboratory, Auburn, AL 36832
boyercr@auburn.edu

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Significance to Industry: *Lantana camara* ‘New Gold’ plants were grown in ten substrates. Treatments contained either 100% pine bark (PB), 100% Clean Chip Residual (CCR) or a blend of one of PB or CCR with peat or composted poultry litter (CPL). Results show that all plants had similar growth to 100% pine bark at the conclusion of the study. Substrates containing CPL produced plants with darker leaves at 60 days after planting, but substrate shrinkage was evident with higher percentages of CPL. Plants grown in CCR were similar in size to plants grown in PB.

Nature of Work: Rising costs (4) for containerized nursery crop substrates (pine bark and peat) have driven the recent trend in substrate research (1, 2, 3, 6). Among the potential media resources is Clean Chip Residual (CCR), a by-product of the forestry industry. CCR is the material left on the forest floor following the harvest of “clean chips” for use in the paper industry. This “waste” is composed of approximately 49% wood, 9% needles, and 42% bark. Roughly 25% of the biomass at these production sites is CCR and the material is generally spread back over the site or sold to pulp mills for fuel, a practice resulting in little or no income for landowners. Use of CCR in container plant production could provide a viable pine bark alternative for nursery producers.

Poultry litter is a major agricultural waste problem in the Southeast. Developing alternative uses for this material is an important environmental issue. Composted poultry litter (CPL) has the potential to provide necessary macro- and micronutrients that may enhance plant growth. However, CPL can potentially harm some crops due to high pH and soluble salts (EC) (5). The objective of this study was to evaluate pine bark and CCR alone and in combination with peat and CPL.

Aged pine bark and fresh CCR were tested alone and in combination with peat and CPL. CCR was obtained from a stand of *Pinus taeda* (about 12 yrs old) and processed to pass a 3/8” hammer mill screen. The CPL was composted for three days in an in-vessel composter. On July 24, 2006 substrates listed below were mixed with the addition per cubic yard of 5 lb. dolomitic lime, 1.5 lb. Micromax and 8 lb. 16-6-13 Polyon 5-6 month fertilizer. Trade gallon containers were filled and planted with liners (72 cell) of *Lantana camara* ‘New Gold’, placed in full sun and irrigated twice daily by overhead irrigation for 30 min. each (total of ½ inch daily). Treatments were mixed on a volume : volume ratio as follows: 100% PB, PB:CPL 3:1, PB:Peat 3:1, PB:CPL 7:1, PB:Peat 7:1, 100% CCR, CCR:CPL 3:1, CCR:Peat 3:1, CCR:CPL 7:1, and CCR:Peat 7:1.

Results & Discussion: At 30 days after planting (DAP) leaf chlorophyll content (Fig. 1) in four treatments had lower SPAD-502 values than 100% PB: PB:CPL 3:1, CCR:CPL 3:1, CCR:Peat 3:1, and CCR:Peat 7:1. However, by 60 DAP those differences (from 100% PB) no longer existed. At 60 DAP treatments containing CPL (except PB:CPL 7:1) increased in SPAD values above that of 100% PB.

While differences existed in shoot dry weight at 72 DAP, all treatments had similar or greater growth than plants grown in 100% PB (Fig. 2). The greatest shoot dry weight occurred with PB:CPL 7:1. pH (Table 1) remained within recommended ranges for the duration of this study though pH in treatments with CCR and/or CPL tended to be higher than those containing PB or peat at the beginning of the study. As expected, EC was high in all treatments 1 DAP, but all decreased to acceptable levels by 30 DAP. Treatments containing CPL were highest throughout the study. Tissue nutrient content showed increased nitrogen, phosphorus, manganese, and copper in treatments containing CPL (data not shown).

Plants of *Lantana camara* ‘New Gold’ grown in CCR with and without CPL grew as well as plants grown in 100% pine bark. Plants grown in substrates containing CPL had less growth early in production, but by termination were larger than control plants. Substrate shrinkage (data not shown) was evident in treatments containing 25% CPL and may render plants grown in CPL at high rates unacceptable for retail sale. For short-term crops incorporation of CPL at low concentrations may increase plant size and quality. More studies with a variety of species is needed before recommendation of these substrates can be suggested. This study does, however, indicate that freshly ground CCR has potential as a sustainable and economical growth substrate for horticultural crops.

Literature Cited

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Table 1. Solution pH and electrical conductivity (EC) of substrates[z].

	1 DAP[y]		15 DAP		30 DAP		60 DAP	
Treatment	**pH**	**EC (dS/m)**	**pH**	**EC (dS/m)**	**pH**	**EC (dS/m)**	**pH**	**EC (dS/m)**
100% PB	4.7 d[x]	2.9 c	5.1 c	2.2 ab	5.4 cde	0.3 a	6.4 d	0.3 c
3:1 - PB: CPL	6.6 b	13.1 a	7.5 a	3.4 a	6.1ab	1.0 a	6.7 abc	0.4 ab
3:1 - PB: Peat	5.0 d	3.3 c	5.2 c	2.5 ab	5.0 e	0.4 a	6.4 d	0.3 bc
7:1 - PB: CPL	6.4 b	8.7 b	6.7 b	2.9 ab	5.7 bcd	0.9 a	6.7 bc	0.4 ab
7:1 - PB: Peat	4.8 d	3.3 c	4.9 c	1.8 b	5.1 de	0.3 a	6.6 cd	0.4 abc
100% 3/8" CCR	5.5 c	2.4 c	5.5 c	2.5 ab	5.8 bc	0.3 a	6.9 abc	0.3 bc
3:1 - 3/8" CCR: CPL	7.2 a	10.8 ab	7.5 a	1.9 ab	6.5 a	0.9 a	7.0 a	0.5 a
3:1 - 3/8" CCR: Peat	5.0 d	3.0 c	5.5 c	2.0 ab	5.7 bcd	0.3 a	6.9 abc	0.4 abc
7:1 - 3/8" CCR: CPL	7.1 a	7.6 b	6.7 b	1.5 b	6.3 ab	0.7 a	6.9 ab	0.4 ab
7:1 - 3/8" CCR: Peat	5.0 d	2.8 c	5.2 c	1.8 b	5.9 abc	0.9 a	6.9 ab	0.3 bc

[z]pH and EC of solution obtained by the pour through method.
[y]Days after potting.
[x]Mean separation within column by Tukey's Studentized Range Test (α = 0.05, n= 4).

Fig. 1. Leaf chlorophyll content as measured by a SPAD-502 meter at 30 and 60 days after planting (DAP). Values within column followed by a different letter are significant using Tukey's Studentized Range Test (a.= 0.05).

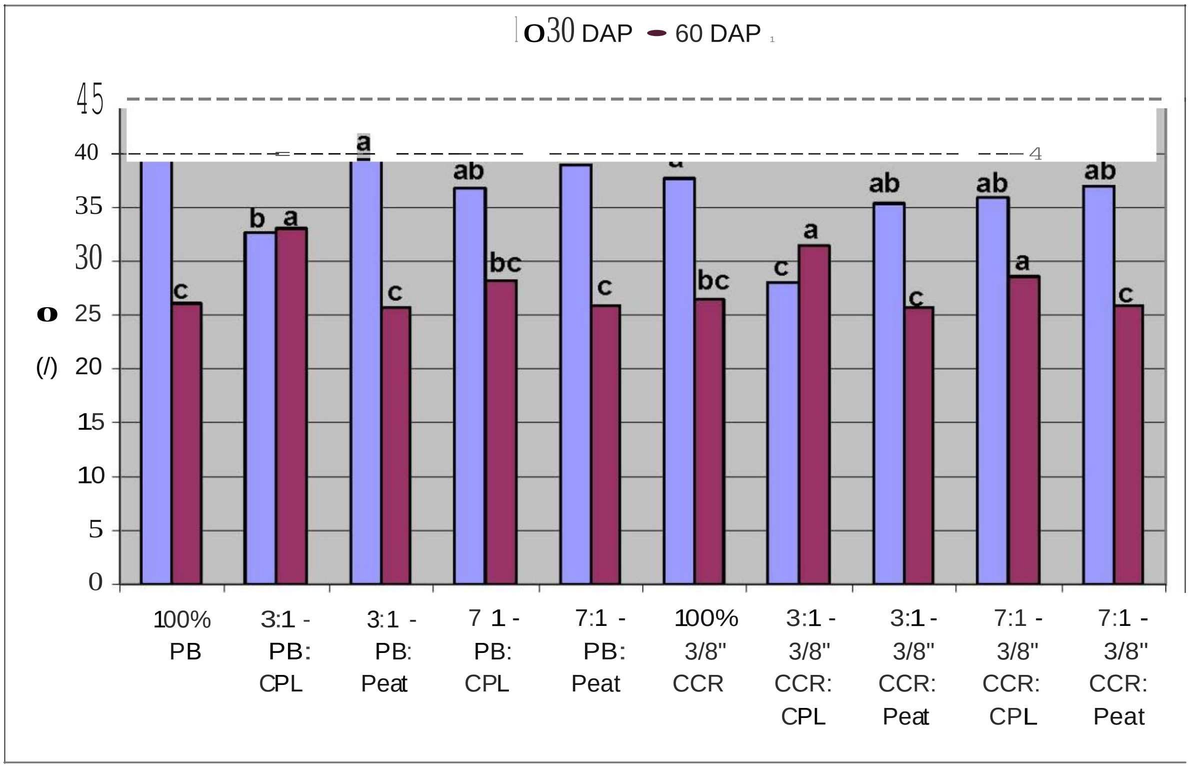
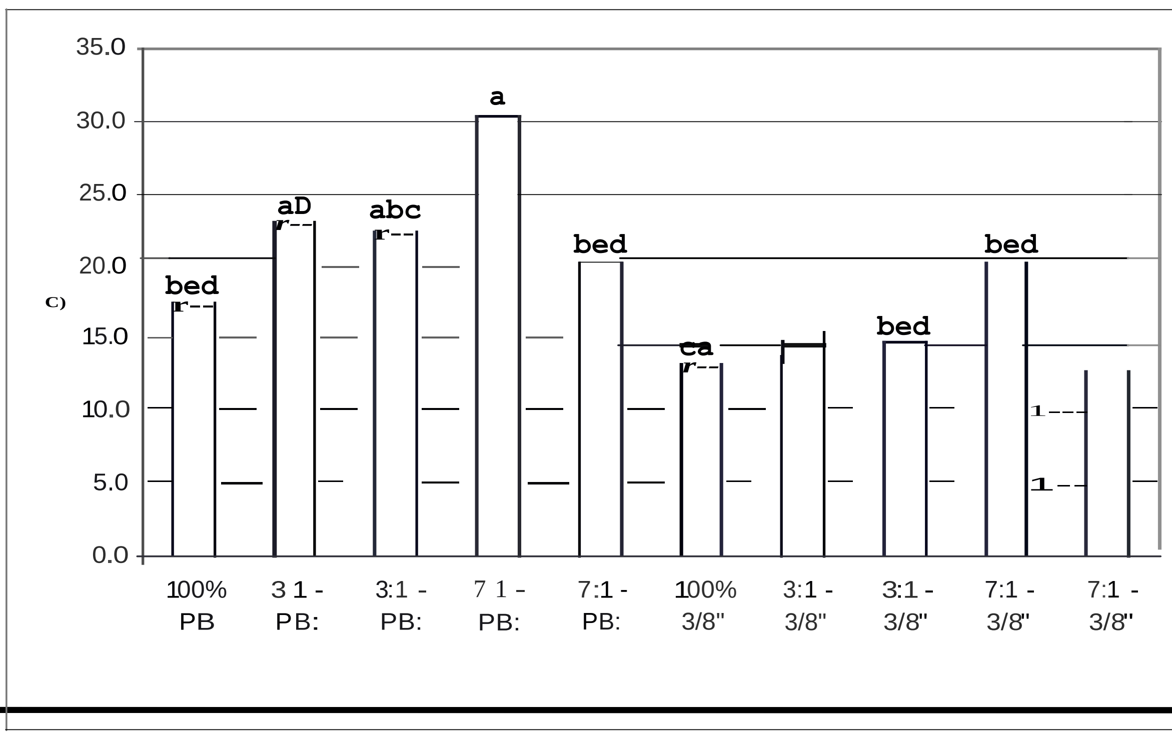


Fig. 2. Shoot dry weight at 72 days after planting. Values within column followed by a different letter are significant using Tukey's Studentized Range Test (a. = 0.05).



CPL	Peat	CPL	Peat	CCR	CCR: CPL	CCR: Peat	CCR: CPL	CCR: Peat