

Effect of Tray Type and Tray Covering on Wicking Speed, Germination, and Spiral Rooting of Tobacco

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Poor tray wicking and spiral rooting continue to be annual recurring concerns in tobacco float systems. Poor wicking of trays can usually be attributed to old media or media that was improperly stored for extended periods of time. Tray design may also influence speed of wicking. Spiral rooting is thought to be due to hard seed coating that causes damage to the emerging root radical. Practices that may change the microenvironment at the top of the cell area surrounding the seed may reduce spiral rooting. Several transplant growers have begun covering trays with a thin fabric such as Reemay[®] or Continental[®] fabric as they are floated and removing the fabric 14 to 21 days later in an effort to reduce spiral rooting.

Experiments were conducted in March 2009 at the Highland Rim Research & Education Center in Springfield, TN to compare two types of trays as well as fabric tray covering on wicking speed, seed germination, and spiral rooting. A standard Poly-covered greenhouse was used with temperatures maintained in a range of 65 F to 82 F. Nitrogen fertility levels were maintained near 100 ppm N throughout the experiment. Trays used were either a standard Speedling[®] (13.5 in. wide by 26.25 in. long by 2.5 in. deep) or a Beltwide[®] “shallow” 1.8 low density tray (13.5 in. wide by 26.25 in. long by 2 in. deep). The Speedling tray cell design was an inverted pyramid with square hole in the bottom. The Beltwide tray had a rounded bottom with a round hole. Both tray types were 288-cell. All trays were filled with Carolina Choice[®] soilless media from a gravity-fed media box and seeded with a 288-cell ABC Quick Seeder[®]. Tobacco variety used was KT 206LC burley from Rickard Seed. Immediately following seeding, each type of tray was either floated uncovered as is the standard practice or covered individually with Continental fabric and floated immediately. Fabric was cut to match the tray dimensions of 13.5 in. by 26.25 in. and staples were used along the outer edge of the covered trays to hold fabric in place. During the first 24 hours after floating, trays were monitored and time required for complete wicking to the top of the trays was recorded. Only uncovered trays were used to evaluate speed of wicking. Fabric was removed at 20 days after seeding/floating and seedlings were evaluated for germination and spiral rooting incidence. Cells from the outer cell row of covered trays were not evaluated. The speed of wicking portion of the experiment was conducted twice, once on non-dibbled trays floated on a sunny day (March 18, 10% cloud cover) and a second time on dibbled trays floated on a cloudy day (March 19, 80% cloud cover). Experiments included 4 replications (4 trays) of each tray type/tray cover combination.

Table 1. Effect of tray type on speed of wicking and dry cells. Experiment 1: Non-dibbled trays seeded and floated on a sunny day (March 18, 10% cloud cover). Data collected from uncovered trays only.

Tray Type	Time required for complete wicking*	Dry Cells per 8 trays after 24 hrs*
Standard Speedling (13.5" x 26.25" x 2.5")	241 min.	9.5
Beltwide Shallow (13.5" x 26.25" x 2")	54 min.	1

*Data within column is statistically different.

Table 2. Effect of tray type on speed of wicking and dry cells. Experiment 2: Dibbled trays seeded and floated on a cloudy day (March 19, 80% cloud cover). Data collected from uncovered trays only.

Tray Type	Time required for complete wicking*	Dry Cells per 8 trays after 24 hrs
Standard Speedling (13.5" x 26.25" x 2.5")	123 min.	0
Beltwide Shallow (13.5" x 26.25" x 2")	55 min.	0

*Data within column is statistically different.

Table 3. Effect of Continental[®] fabric tray covering on seed germination and spiral rooting at 20 days after seeding and floating. Data are averaged over tray type. No statistical differences between tray covering treatment for germination or spiral rooting.

Tray Covering	% Germination	% Spiral Rooting
No Cover	93.5	3.01
Continental fabric	94.2	3.24

Effect of Tray Type on Speed of Wicking

There were differences between the two experiments in the time required for complete wicking of the Speedling trays. These differences could be due to dibbling, cloud cover at the time of floating, or both. Speedling trays dibbled and floated on a cloudy day required approximately half as much time for complete wicking as did Speedling trays not dibbled and floated on a sunny day. There were no differences between the two experiments in time required for complete wicking in the Beltwide trays. Tray type did have a significant effect on time of wicking in both experiments. The Beltwide shallow trays required only 54 to 55 minutes for complete wicking in either experiment, compared to 123 to 241 minutes for the Speedling trays.

Effect of Tray Covering on Germination and Spiral Rooting

Germination and spiral rooting data are averaged over tray type as there was no effect of tray type on germination or spiral rooting (data not shown). There were also no effects of tray covering on germination or spiral rooting incidence. KT 206LC had 93.5 to 94.2% germination and 3.01 to 3.24% spiral rooting at 20 days after seeding and floating regardless of whether fabric tray covering was used or not. Germination and spiral rooting levels were considered normal.

For questions regarding this publication, please contact Andy Bailey at abailey@uky.edu