

## EFFECTS OF POLLINATION BAGS ON FLOWER DEVELOPMENT AND COLD DAMAGE IN A LOBLOLLY PINE SEED ORCHARD

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The NCSU Cooperative Tree Improvement Program and its members installed the third round of prototype pollination bags for the ongoing PBS Pollination Bag Study in spring 2017. The installation included an open-pollinated control, a kraft paper pollination bag with support wire, the previously tested PBS-A bag, and two new prototypes from PBS International (bags A2 and I2). At the NC Forest Service seed orchard in Goldsboro, NC bags were installed on March 6 just prior to female strobili opening. Temperature recorders were installed into all bags and one open-pollinated branch per tree. Eight days after bagging and just prior to the arrival of a significant cold front, flower development was checked to see if variation existed in flower stage. Bag type PBS-I2 had a significantly higher proportion of flowers with female strobili that had not yet opened compared with all other treatments which were further developed. Two days later there was an extreme cold event (low of -6.5°C/20°F) for two nights. The flower survival at time of bag removal was assessed on April 5, 2017. The bag main effect was highly significant ( $P < 0.0001$ ) for flower survival. Female strobili that were bagged using PBS-I2 were approximately twice as likely to survive to bag removal than strobili bagged using the kraft paper bag with support wire. Open-pollinated strobili were approximately three times more likely to survive than flowers bagged using the kraft paper bag with support wire. Bag type PBS-I2 slowed the development of flowers compared to the other bag types, which was likely the reason for the higher survival of flowers in bag type PBS-I2 at time of bag removal. Heat sums were calculated from the temperature data, but these did not completely explain the reduced flower development in PBS-I2. Open-pollinated strobili were superior for flower survival when compared to all bag types.