

**COTTON FLOWERS: INVESTIGATING THE INHERITANCE OF POLLEN HUMIDITY  
SENSITIVITIES AND FLOWER SHAPE****John J. Burke****USDA-ARS Plant Stress and Germplasm Development Unit  
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This study investigated the inheritance of flower shape (open versus cupped petals) and abiotic stress tolerance of mature cotton [*Gossypium hirsutum* (L.)] pollen. Inheritance of flower shape was evaluated in the F1 plants from bi-directional crosses of Stoneville 474 (STV474); Phytogen 72 (PHY72); Deltapine 565 (DP565); Suregrow 248 (SG248); New Mexico 67 (NM67); and PHY72. Additionally, flower shape was evaluated in F2 populations of STV474 by PHY72. The inheritance of the moisture sensitivity of pollen was evaluated in F1 and F2 populations of bi-directional crosses between STV474 and PHY72; DP565 and SG248; NM67 and PHY72. Molecular markers were used to evaluate the parents and F1 seedlings to ensure that the plants evaluated were F1s and not selfed offspring. Analysis of the F1s was completed and seed harvested from mature bolls for the development of Recombinant Inbred Lines. Forty flowers from each F1 plant were photographed and ranked from the most cupped to the most open flower shape. The flower shapes of the 20 and 21<sup>st</sup> ranked flowers were evaluated as indicators of mean flower shape for the F1 plant. F2 plants (250 for each directional cross, 10 replicates per line) were evaluated for flower shape of the STV474 by PHY72 recombinant populations by rating flower openness on a scale of 1 (open) to 4 (closed). Forty flowers from each F1 plant were evaluated for the time it took a pollen grain to rupture in 0.8 M sucrose. F2 plants (250 for each directional cross, 10 replicates per line) were evaluated for pollen moisture sensitivity in each of the F2 populations of the bi-directional crosses. The results of this F2 population analyses suggest that flower shape is paternally influenced and that pollen moisture sensitivity is maternally influenced. Cotton Incorporated Project #05-703.