

**METHODS TO EVALUATE VARIATION IN  
COTTON GLAND DENSITY AND DISTRIBUTION**

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**Abstract**

One common characteristic, of cultivated cotton and its wild relatives, is the presence of glands on both the reproductive and vegetative parts of the plant. The glands contain compounds that are toxic to many insect pests and can help protect the plant from tobacco budworms (TBW), bollworms (BW) and plant bugs. The focus of our research is to increase the natural insect tolerance of cotton varieties by elevating the level of these toxins, then increasing the number and modifying the location of the glands storing the toxins. Work done by ourselves and others show that crosses between cotton varieties with different gland densities and distributions often produce a continuous range of types, indicating that it should be possible to produce improved varieties if quick and accurate methods for screening can be developed. For our studies we developed and tested methods to make digital pictures of large numbers of samples that can be analyzed, whenever time allows, using software that automatically counts gland numbers. Automatic counts were shown to be more accurate than counts done by eye on the same pictures. Automatic counts took an average of 20 seconds per count compared to 60 seconds for a manual eye count. Manual counts decreased in accuracy as the number of samples counted increased and accuracy varied with the person counting. Neither of these problems was noted with the automatic counts. This procedure can be used for counting glands on leaves, cotyledons and seeds.