Project CSP 101C Expansion of drying facilities at ACRI

SUMMARY

An industrial shed (9 x 12m) with concrete flooring and roller door access was constructed at ACRI in November 1998. The shed was sited in close proximity to other sample processing buildings. A drying room was constructed within the shed using insulation panelling with single door access. This room was then fitted with shelving and a mobile dehumidification unit installed. This unit efficiently removes water vapour from the atmosphere within the room using refrigeration technology. The unit can remove in excess of 40 L of condensed water vapour each day. This is sufficient to dry plant material on fully laden shelves within 2-3 days. The drying period is similar to the existing dehydrators, but the new facility uses a fraction of the electricity consumed by the older dehydrators. The unit operates at about 50°C compared with the older units which operate at 80 °C. The unit was operating by mid-January 1999, prior to the busiest part of the cotton season. It was in constant use until mid-winter 1999.

Objectives:

- To alleviate the mounting demand for dehydrator space and allow for drying of greater numbers of samples of cotton plant material, soil and delinted cotton seed.
- To expand the dehydration facility which will dry samples effectively and quickly at near ambient temperatures.

Research project summary:

The capacity of the drying facility at ACRI has not kept pace with the increase in staff over the past two decades. The new installation would increase the current capacity by 50%, which would ease the current situation. A further unit may be required with further increased demand. The efficiency of drying depends on the amount of material loaded. Engineers suggest that the proposed installation would be at least comparable to the existing units.

The initial cost of the new installation would be much less than the units currently operating at ACRI. The new unit would be house in a shed to be erected adjacent to the current facility which would have capacity to house two dehumidiificatoin units. Because it operates by dehumidifying air, rather than heating it, the new unit would be cheaper to operate and samples would not be subjected to high temperatures which could affect their chemical composition.

Purchase of a unit similar to those operating at present would cost $45,000. Vacuum drying equipment, although much quicker, would cost in excess of $100,000.

Scientific importance:

The current facility for drying samples at ACRI relies on two electrically heated forced air dehydrators which were installed some 20 years ago. At that time, the facility was adequate for the few researchers stationed at ACRI. At the current time, staff at ACRI has increased 5