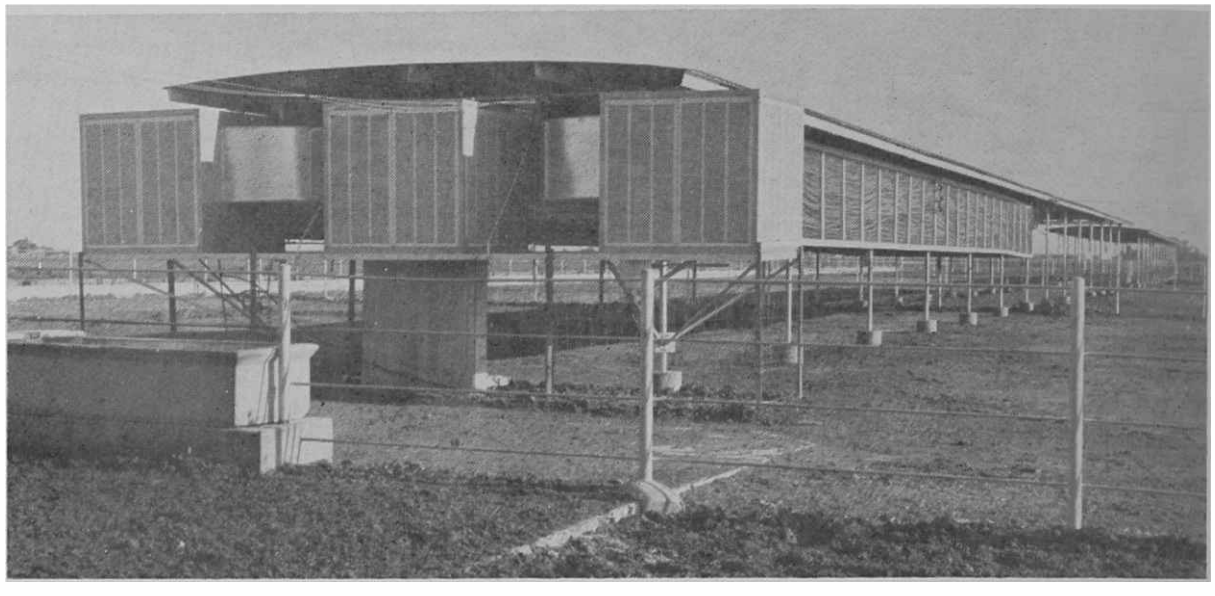
Providing an evaporative-cooled environment for dairy cattle during the summer can markedly increase breeding efficiency and milk production. Not many cattle are given this plush treatment but in two years of testing at an Arizona dairy, 43 such privileged cows produced 6.5 percent more milk, besides responding with a breeding efficiency twice that of similar cows provided with conventional shade.

COOLCOWS DO BETTER

By G. H. Stott and

Frank Wiersma



END VIEW of shade area, showing the three large evaporative cooler units, which blow cooled air into the long plastic ducts.

Arizona dairymen are acutely aware that dairy cows are subject to temperature stress during summer months. When air temperatures rise above 80° F., animals begin to feel discomfort. This is especially true of a lactating cow where both feed digestion and milk production generate large quantities of heat.

The only source of heat dissipation is to the surroundings. When this gets warm, heat is generated faster than it is dissipated. The heat accumulation results in a rise in body temperature. Although 101° F. is normal for cattle, it is not uncommon for Arizona dairy cows to have rectal temperatures of 106° F. or 107° F. during hot days. This would prove fatal if it were not for relief through the cooler night temperatures.

Breeding Efficiency Reduced

Naturally, when any cow is running a fever of this magnitude, she cannot produce at optimum levels. The total annual milk production from Arizona cows calving in June, July and August has been reported to be 20 percent lower than that of cows calving during the cooler months. The loss in reproductive efficiency is even more serious. Carefully conducted experiments during summer months in Arizona indicate a drop in actual pregnancy in lactating cows at 40 days post-breeding from 60 percent down to 17 percent.

University of Arizona dairy scientists have been studying the physiological effects of heat stress for a number of years. One phase of their studies suggested that the damage to reproduction caused by high temperature occurred during a relatively short period immediately after breeding. This presented the possibility of combating the problem by placing cows in an ideal environment for a day or two at breeding time.

Cooling Cows in Heat

To test this possibility, University of Arizona agricultural engineers designed and built at Dewer Dairy, near Mesa, a refrigerated enclosure to provide this temporary environment. The enclosure was similar to a small stanchion barn, but equipped to maintain a climate considered ideal for dairy cattle. The barn had room for six cows.

When the herdsman at Dewer spotted cows in estrus, he selected some at random to be temporarily confined in the barn and left the others to be handled according to their regular procedure. The cows selected for confinement were placed in the cool barn and, when their temperature was down to normal, were bred. This cooling period usually took six to eight hours. They were kept in this cool climate for periods varying from 24 to 200 hours. The objective was to learn if temporary relief from heat stress would improve breeding efficiency. If so, how long should the cow be confined to get results?

Although some improvement was observed during both of two years of testing, the increase was not sufficient to justify the cost of cooling plus the additional labor necessary for the special handling of the cattle. This failure to respond may indicate that short term relief is ineffective.

Pinpointing the cause of failure to respond favorably was confounded by an obvious nervousness and discontent in the cows. Placing them in the confinement of a strange building caused a disruption in their feeding and milking routine. Their free-

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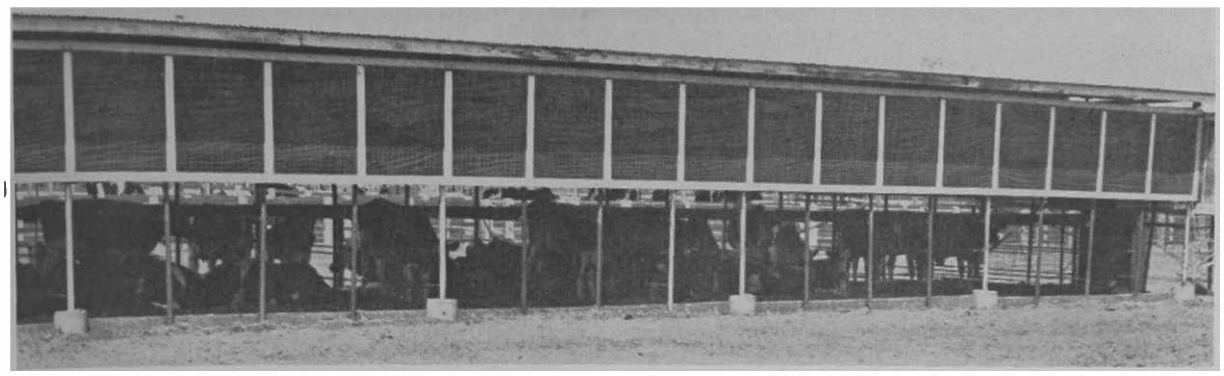

BOVINE RESIDENTS are cool and happy, under their air-cooled shade. Contented cows gave more milk.

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dom of movement enjoyed in the corral was exchanged for four walls and a stanchion. They were cool, but the abrupt change in environment was disturbing, and may have influenced their breeding response.

Since the refrigerated enclosure was only partially effective and therefore impractical, the engineers went back to the drawing board to design a more practical facility.

Coolers in Shade Area

The need for economy suggested evaporative cooling, and the management requirements suggested a free access facility located in the corral. These requirements were achieved by sacrificing the high level of climate control available in the refrigerated barn. A conventional shade at Dewer Dairy was equipped with three large evaporative coolers, each blowing air into a long collapsible plastic duct extending the length of the shade. Each duct had a 4-inch slot along the bottom providing continuous openings through which cool air was blown downward onto the backs of the cattle.

Peak temperatures under the cooled shade were 10° F. to 12° F. cooler than corresponding temperatures under a conventional shade. The continuous flow of air added substantially to cattle comfort. The cattle immediately accepted the facility and although initially curious, showed no apparent disturbance by the modifications.

Milk Production Rises

The response by the cattle to their improved summer climate was most encouraging. During June, July and August, they outproduced a similar group of cattle provided with conventional shades by four pounds of milk per day per cow. This represents an increase in gross income of almost $800 per year for one corral with 43 cows.

The reproductive benefits, more difficult to describe monetarily, were of equal or greater importance. Breeding efficiencies in the cooled group were maintained at a cool weather normal of 60 percent throughout the two summers of operation. The group without additional cooling averaged 35 percent.

Only one objectionable characteristic was apparent in the evaporative-cooled shade. The ground became wet and more difficult to maintain acceptable for good sanitation. The addition of free stalls solved this problem during the second year. However, there are hopes of designing less costly means of accomplishing this.

May Be Here To Stay

Future plans are to expand the present program in designing facilities that will cool dairy cattle most economically. As yet only the feasibility and effectiveness of cooling during the hot summer months has been determined. There is much yet to learn. Just as shades are in common use in dairies today, evaporative-cooling for cows during the summer may become equally common.

PRESIDENT PRAISES NATION'S FARMERS

"The American farmer in the last 30 years has advanced more in agricultural abundance and farm fertility than all the farmers in all the history of recorded time.

"One American farmer now feeds and clothes himself and 32 others besides — an achievement unmatched anywhere on earth.

"One man on the farm today does all the work that was performed by four in 1939. If this were not so, we would need 23 million farm workers to feed and clothe ourselves, instead of the 6.5 million we have.

"Thirty years ago, the city worker toiled 85 hours each month to feed his wife and children. Today he works less than half as long, and the food his family eats is both more appetizing and more nourishing.

"The miracle of American agriculture is thus an example to all the world's billions of the wisdom and the rewards of our democratic system. For more than a century, that system has encouraged development of the family farm and the free and independent farmer.

"Government has assisted land distribution. It has provided agricultural research and education. It has extended credit, and helped to stabilize prices. But the holding and working of the land has remained with the independent farmer in the basic American tradition.

"The preservation of that tradition has been the goal of all our farm policies of the last three decades."

(From the statement by President Lyndon B. Johnson, upon signing of the Food & Agriculture Act of 1965).

'Synthetic' Grain Is Tested by Canadians

Triticale, the synthetic grain that has been getting attention around the country over the past few months, is still in a highly experimental stage of development at a Canadian experiment station according to agronomists.

Triticale is a cross between wheat and rye which was done at an experiment station at Manitoba. Preliminary research indicates the crop, if developed, could have a potential as a feed crop or possibly as a cash crop.

B. Charles Jenkins, research professor at the University of Manitoba, who has been working on the crop, says that as yet there is no grain available for release. Nor is there any seed available for experiment testing.

The Canadian researcher says seed will not be available for some time. Agronomists at South Dakota State University indicate the potential of the new crop for South Dakota producers cannot be determined until seed material is secured and the crop evaluated in a test plot program.