tons, one from Arizona (*G. thurberi*) and two from Mexico (*G. hirsutum* var. *richmondii*), a commercial *barbadensi* from Peru (Tanguis), and a Tanguis-Acala 4-42 cross. While mites also attack these biotypes, damage has been light.

Acala 4-42, presently grown by California farmers, was found to be intermediate in its resistance to mites with average infestation scores ranging from 3.0 to 4.5. This indicates that the past breeding program at Shafter has been indirectly successful in developing and maintaining resistance to spider mites. Advanced lines in the current breeding program—developed to improve yield, quality and seed value for future Acala seed releases—were equally resistant.

Colonies formed by spider mites are different in appearance. Spider mites normally form a colony on the lower leaf surface, which is covered by a loose web. A few or many mites may feed within this colony in close association with one another. As the population increases, the colony spreads over the leaf to accommodate the increasing number of mites, and to provide them with fresh feeding areas.

In some of the more resistant biotypes (those showing a lower damage score), the mites spread over the leaf surface and do not form colonies. On other biotypes they may form a compact colony which fails to grow. These characteristic differences have been indicated in the table.

The biology of the two-spotted mite is being studied to determine differences in developmental life history and reproductive ability between mites on the more susceptible and those on the less susceptible biotypes. Special microcages illustrated, allow researchers to follow individual mites through an entire life cycle.

The genetic relationships of the resistance evident in Acala cottons are also being evaluated. A breeding program has been undertaken aimed at providing a genetic foundation on which greater resistance can be built in the future. California cotton farmers should not expect resistance in their cotton immediately since research of this type must progress slowly in order to preserve the other qualities for which their product is best known. Greatest savings for growers will come through reduced use of chemical control measures possible with resistant cotton varieties.

Thomas F. Leigh is Assistant Entomologist, Department of Entomology and Parasitology, U. C. Davis; Angus Hyer is Research Agronomist, Crops Research Division, U.S.D.A., Shafter.

J. L. HULL · J. H. MEYER

MILO EQUAL TO BARLEY

for Full Supplementation of Beef Cattle on Irrigated Pastures

Full supplementation by free-choice feeding of either rolled or ground barley to cattle on irrigated pastures brought them to acceptable slaughter condition within a 120- to 150-day feeding period—as previously reported in California Agriculture. Additional trials conducted using the same pastures have shown that rolled milo is equally acceptable when full-fed with pasture.

SUPPLEMENTAL feeding of cattle grazing irrigated pasture has been practiced for many years. Although relatively good gains can be achieved when the only feed is high-quality pasture forages, it is well recognized that an additional source of energy is needed to produce a finished animal with a high dressing percentage and a high grading carcass—over a reasonable feeding period. Tests at Davis have shown that full feeding of either rolled or ground barley to cattle grazing an irrigated pasture will supply this extra energy. No differences were obtained between either form of barley full-fed to cattle grazing irrigated pastures. Similar results have also been obtained for cattle being fattened in drylot.

An additional trial was conducted using these same pastures (orchardgrass and Ladino clover mixture) with a comparison of rolled milo vs. rolled barley for pasture fattening of cattle, as summarized below:

PASTURE VS. DRYLOT FATTENING

Ration	Rolled barley plus pasture	Rolled milo plus pasture	70% conc. drylot ration
No. of days on feed	150	150	144
No. of animals	6	6	7
Daily intake of concentrates, lb.	13.7	13.4	12.2[1]
Initial wt., lb.	631	628	601
Av. daily gain, lb.	2.34	2.37	2.44
Dressing, %	60.9	61.1	62.1
Av. % carcass fat	23.1	22.9	21.8
Av. carcass grade	High good +	High good +	High good +
Av. 20% fat-corrected carcass, lb.[2]	652	652	622

[1] Animals consumed 17.4 lb. per day total ration.
[2] Corrects carcass wt. to 1,297 kcal. per lb., 20% fat and 17.3% protein.

No differences were found between treatments. The pasture steers consumed slightly more grain than the drylot steers but had a slightly lower dressing per cent. The pastured animals had slightly higher fat content in their carcasses so when the carcass weights were corrected to a 20% fat basis, to give a more correct comparison between treatments, these differences were no longer evident. There was no difference in final carcass grade. At slaughter no sign of "yellow" fat in the carcasses was noted. It was concluded that either rolled or ground barley or rolled milo was acceptable when full-fed with pasture.

These results have been confirmed, using barley, in field trials in Madera, Lake and Shasta counties. One disadvantage noted in some field trials was the appearance of some lame cattle after 90 days on feed. Color of carcass fat was comparable for pasture or drylot fattened cattle.

Results obtained indicate that the following factors be considered: (1) a high-producing but palatable pasture containing a mixture of legumes and grasses is needed; (2) the usual stocking rate of the pasture can be doubled; (3) the desired grain can be fed free-choice and kept constantly available after a 3-week period in which the animals are brought on feed; (4) cattle should be rotated between fields within the pasture to keep the forage palatable and to facilitate irrigation; (5) control of internal parasites is necessary; and (6) since this is a high energy ration an increased daily gain can be expected with a 30 mg. implant of diethylstilbestrol.

Cattle can be expected to consume from 10 to 15 lb. of grain plus enough pasture to gain between 2.25 and 2.75 lb. daily and will reach acceptable slaughter condition in 120 to 150 days with this system. The limited length of most pasturing seasons means the starting weight of the cattle should be 700–750 lb. for finishing at 1000–1050 lb. live weight.

John L. Hull is Associate Specialist and James H. Meyer is Professor and Animal Husbandman, Experiment Station, University of California, Davis.