Semen Quality in Beef Bulls

tests with young and older bulls, based on percentages of living, motile, and abnormal sperm and breeding efficiency

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Poor quality semen can be produced by bulls of any age, but recovery in 3–6 months was found in nearly half of such bulls that could be retested.

Semen samples were obtained from 460 bulls 15–24 months of age, from 53 bulls 3–6 years of age, and from 12 bulls 2–6 years of age, used for breeding. The test on the first two groups is recorded in the table in the first and second columns.

Of the 460 young bulls, 37—about 8%—produced semen that would indicate reproductive efficiency of 30% or less, but only 22 of those 37 were available for retests. Ten showed improvement in semen quality sufficient to consider them normal bulls, but in 12 bulls—2.5% of the 460 tested—the quality of semen did not improve. Retests covering periods of 6–18 months indicated that the impaired breeding efficiency of those bulls was probably permanent.

Semen from bulls that later showed recovery was characterized by low motility, average to high percentage of live sperm, and an intermediate number of abnormal sperm. Tests on one such bull are recorded in the table in the second column. However, semen characteristics differed among individual bulls.

The first indication of impaired sperm was the appearance of white flakes and mucus in the sample. Other bulls, possibly representing a different stage of the condition, showed a partial coagulation of the semen, giving it a ropy appearance when poured from the vial. In such samples, motility was nil, more of the sperm stained dead, the abnormals increased and leucocytes—white blood cells—were found on the stained slides. Practically all of the abnormal sperm consisted of normal sperm heads detached from their tails. When sampled with the artificial vagina, semen from two bulls that had produced samples with leucocytes was similar to that collected with the electro-ejaculator and, in addition, showed that the concentration of sperm was decreased to about one tenth that found in normal bulls.

The cause for this condition is not known, but the presence of leucocytes and other characteristics of the semen strongly indicate infection. Most of the bulls showing this condition that were available for retesting returned to normal in 3–6 months. Further research is needed to learn more about the over-all effects of the condition on fertility.

Semen from bulls that did not show improvement when retested contained all types of abnormal sperm, including types with malformed heads. Results of the test on one such bull are given in the table in the third column. In two such bulls, other constituents of the semen resembled those found in dairy breeds. Pedigree analysis of other bulls showing poor quality semen of a similar nature suggests that production of poor quality semen by this group of bulls is an inherited trait.

In 53 bulls aged 3–6 years, the incidence of poor quality semen was much greater than in young bulls, but some of the bulls were brought for testing because there was reason to suspect that their fertility was impaired. Possibly, also, some undetermined environmental factors, with cumulative effects, cause lowered semen quality in the older bulls.

Of the older bulls, 32% showed motility less than 40%, about 21% showed less than 40% live sperm, and 13% showed more than 35% abnormal sperm. Three of the 53 older bulls had one testis atrophied.

Only six of the older bulls that had poor quality semen on one test were available for retesting. Four of the six showed improvement by the end of three months—a sufficient period for a complete cycle of spermatogenesis. One of the two animals that failed to show improvement on retest had been used for crossbreeding the previous year, but had not sired any calves.

Of the 12 bulls used for breeding, four were used in artificial insemination, six were used naturally in breeding herds, and two were placed with heifers being fed for slaughter. Those two bulls re-

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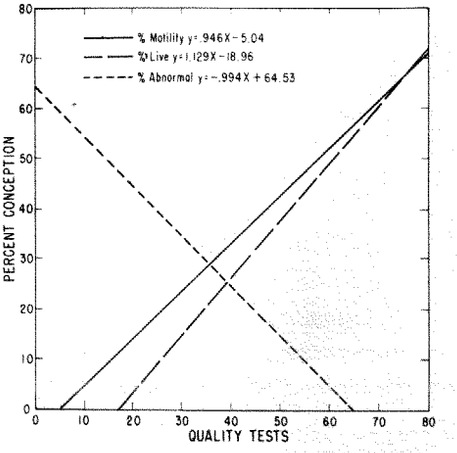

Regression curves showing the relation between semen quality and conception rate of twelve bulls used for breeding. Y = rate of conception.

Semen Quality Characteristics of Bulls in Two Age Groups

Motile sperm %	Young bulls %	Mixed-age bulls %	Live sperm %	Young bulls %	Mixed-age bulls %	Abnormal sperm %	Young bulls %	Mixed-age bulls %
> 90	23.9	7.5	> 90	20.6	17.0	1–5	20.4	28.3
80–89	22.4	9.5	80–89	35.6	28.3	6–10	36.1	30.2
70–79	19.9	18.9	70–79	19.0	11.2	11–15	22.2	9.4
60–69	14.5	13.3	60–69	10.6	15.1	16–20	9.2	5.7
50–59	6.7	11.3	50–59	5.8	3.8	21–25	4.6	7.5
40–49	4.2	7.5	40–49	4.9	3.8	26–30	3.2	1.9
30–39	3.6	11.3	30–39	1.4	5.7	30–35	1.3	3.8
20–29	0.8	7.5	20–29	0.8	5.7	> 35	3.0	13.2
10–19	1.7	0.0	10–19	0.4	1.9			
0–9	2.3	13.2	0–9	0.9	7.5			

Characteristics of Semen From a Young Bull that Showed Improvement on Retest

Date of test	Test No.	Motile sperm %	Live sperm %	Abnormal sperm %
5-9-58	1	0	74	14
5-20-58	2	0	39	21
9-30-58	3	60	54	13

Characteristics of Semen From a Young Bull that Did Not Show Improvement on Retest

Date of test	Test No.	Motile sperm %	Live sperm %	Abnormal sperm %
5-10-57	1	20	32	40
9-25-57	2	10	16	52
5-9-58	3	5	33	50
9-30-58	4	0	7	87

Spray for Soil Erosion Control

surface spray of polyvinyl alcohol stabilizes soils on banks or lawn area without injury to plants or to seed germination

John J. Stark

Tests with Elvanol, grade 71-30, indicate that the material might replace straw and wire for control of water or wind erosion. It has been applied on newly seeded lawn areas and on previously planted banks without apparent plant injury or reduction of seed germination.

Elvanol is a polyvinyl alcohol in the form of a free-flowing powder, and may be readily dissolved in water at 170°F to give a concentrate with the consistency of rubber cement. The concentrate may be stored in a closed container for prolonged periods and diluted with cold water at the time of application.

The same chemical compound is used in many products—as a water resistant adhesive, a remoistenable adhesive, and a laminating adhesive. It is used also in many paper, plastic, and textile products. In the soil its action is apparently one of coating the surface particles with a thin film of adhesive, which joins the particles firmly together but leaves many spaces for the entry of air and water. After application, Elvanol will absorb cold water up to 40% of its weight without redissolving, and is found to offer very little resistance to the normal growth of plant roots.

Elvanol, applied on a two-acre sloping lawn—recently graded and seeded—substantially reduced erosion around the sprinkler risers, which had been a major problem. The previously planted seeds germinated and produced an excellent turf.

The rate of application was 20 gallons of a 3% Elvanol solution, sprayed uniformly over an area of 1,000 square feet. The soil should not be wet or excessively dry at the time of spraying. To secure the bonding action of the material, the soil should be allowed to dry and should not be disturbed after treatment.

Elvanol is available in powder form or as a 6% concentrated solution in 55-gallon drums.

John J. Stark was Farm Advisor, Los Angeles County, University of California, when the above reported study was conducted.

MARKETING

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marketing orders, is designed to correct or prevent deceptive practices in the marketing of a product, making false claims or misleading representations, and improper sampling and grading.

Marketing Tools

Marketing orders by themselves are only devices and tools and their effectiveness depends upon the skill and judgment of the operators and on the nature of the problems involved.

There are no fixed rules for formulating and operating marketing programs. However, the provisions of a marketing order should consider the probable effects on net returns over a period of several years. Too often marketing programs are judged by their effect on one year's price. In operating any marketing program, attention must be given also to competitive effects on other products and to market-entry possibilities from other areas.

Industry Support Required

California legislation provides that a marketing order regulating producers can not become effective unless written assent is given by at least 65% of the producers representing 51% of the volume, or by at least 51% of the producers representing 65% of the volume.

Many California marketing orders apply jointly to producers and handlers of the commodity affected. In such cases a marketing order can not become effective unless—in addition to the producers' approval—written assent is given by at least 65% of the handlers by number or volume. An exception applies to the processors of canned and dried fruit for which the requirement is 65% by number and by volume. Orders affecting only handlers require assent from the same proportion of handlers as do joint orders.

The State Director of Agriculture has responsibility for the operating and enforcement of marketing order provisions. He appoints, from industry nominations, Advisory Boards which make recommendations to him. Where necessary, state and local law enforcement agencies and legal divisions are available to render service; violations are referred to the Attorney General's office for prosecution.

The costs of California marketing programs are borne directly by the industries themselves through assessments on producers and handlers. In 1957, assessments for all programs totaled $8,474,000—of which about 58% was spent for market promotion; 29% for administration, inspection, and enforcement; and 3% for market research. The percentages vary widely from one program to another.

Some orders are issued with a specific date of termination. However—after hearings and the required assent from the industry affected—the Director of Agriculture may extend the order. Other orders operate continuously. Several of the present California orders have undergone a series of amendments to keep the order geared to the changing needs of the industries concerned.

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BULLS

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mained with the heifers for 30 days. At slaughter—30 days later—the percentage conception was calculated from the number of fetuses of the proper size.

Regression equations were calculated from semen quality tests on the 12 bulls used for breeding. Regression lines drawn from these equations are shown in the graph.

If a conception rate of 30% or less is considered impaired breeding efficiency, the graph indicates that impairment may be present when less than 43% of sperm are living, or less than 37% are motile, or more than 35% are abnormal.

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