AN ANALYSIS OF ANGUS CENTRAL BULL PERFORMANCE TESTS IN NEW ZEALAND

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SUMMARY

Data from 521 New Zealand Angus bulls in 14 central performance tests over 4 seasons have been analysed. Mean start-age was 250 to 305 days, start-weight 245 to 316 kg, test gain-per-day 0.68 to 1.05 kg/day. Days on test varied from 244 to 304 days except for two dry seasons of 119 and 181 days. Start-weight and end-weight were highly correlated but this varied over the tests from $r = 0.38$ to 0.85. The conclusion from this work, supported by other New Zealand research is that these tests as presently organized are limited in their efficiency in identifying genetically superior bulls. Reduction in start-age is an urgent priority. Breeders must weigh the benefits of these tests in both genetic and non-genetic terms against their costs of operation.

INTRODUCTION

ALTHOUGH performance testing of beef bulls at central stations has been used extensively in other countries (*e.g.*, U.K.: Meat and Livestock Commission, 1971), it has only recently been established by breeders in New Zealand.

The New Zealand tests are based on pasture feeding for 250 to 300 days with no housing of stock. This practice differs considerably from tests in Europe (Krausslich, 1974), North America, South America and Britain (Preston and Willis, 1970). The recent British work has been reviewed by Lewis and Allen (1974).

This paper presents the first analysis of privately sponsored central tests in New Zealand in an attempt to offer comment for future policy.

EXPERIMENTAL

These data were from central performance tests carried out in different regions of New Zealand organized and financed by members of the New Zealand Angus Association. There were 4 tests in 1971, 5 in 1972, 4 in 1973 and 1 in 1974. The tests started after weaning (which was not specified in terms of age

or weight) and continued until the bulls were 20 months of age. The only pre-test specifications set by the test organizers were that bulls had to suckle their own dams to weaning and not receive creep feed. Age spread at the start of each test was restricted to two months and it was recommended that calves from heifers should not be included. Bulls were generally weighed monthly and final assessment was made on end-weight (a mean of two consecutive day's weighings) corrected for age.

RESULTS

The general summary of means and standard deviations for each test over the four years is presented in Table 1.

The correlation coefficients among the variables measured are presented in Table 2.

The practical effect of these correlations is shown in Table 3 by selecting the top 25% of bulls in each test on start-weight, and then measuring how many of these same animals remained in the top 25% when assessed on end-weight and gain-per-day on test.

DISCUSSION

Table 1 highlights the very late start-age of bulls in these tests (an overall mean of 280 days) which is even older than the criticized Meat and Livestock Commission's (MLC) range in start-age of 218 to 252 days (Allen and Lewis, 1970). Start-age for central tests in France is 126 days, Germany 50 days, Sweden 30 days, and Denmark 45 days (Lewis and Allen, 1974). Clearly, start-age in the New Zealand tests must be reduced.

Start-age variation has been effectively restricted in these tests but, as expected, start-weight shows considerable variation. However, the correlations of start-weight and start-age are not consistently high (Table 2) so high start-weight was not due entirely to age.

Most centres in these tests, with a grazing regime, aimed to achieve at least 250 days on test. This compared with 160 to 182 for MLC tests where feeding was more intensive (Allen and Lewis, 1970). The variations in gain-per-day and end-weight (Table 1) clearly demonstrate the variation in growth potential of New Zealand Angus bulls.

The main concern in central performance tests is the correlation of start-weight and end-weight which is generally high (Preston and Willis, 1970; Lewis and Allen, 1974). These results (Table 2) confirmed this conclusion. When these correlations

TABLE 1: CENTRAL PERFORMANCE TEST SUMMARY

Year	Test Centre	No. of Bulls on Test	Start Age (days)	Start Weight (kg)	Days on Test	Test Gain/Day (kg/day)	End-weight (kg)
1971	1	39	279 ± 19	268 ± 34	281	0.85 ± 0.09	506 ± 43
	2	31	297 ± 18	311 ± 28	272	0.70 ± 0.09	502 ± 39
	3	34	282 ± 21	292 ± 33	300	0.70 ± 0.09	502 ± 41
	6	30	259 ± 17	245 ± 28	294	0.79 ± 0.08	477 ± 35
1972	1	65	293 ± 20	304 ± 31	266	0.86 ± 0.14	534 ± 42
	2	38	288 ± 19	316 ± 29	278	0.71 ± 0.10	513 ± 24
	3	35	277 ± 15	308 ± 31	291	0.85 ± 0.09	556 ± 34
	5	35	292 ± 20	280 ± 35	265	0.82 ± 0.10	498 ± 44
	6	30	257 ± 19	256 ± 32	273	0.93 ± 0.15	510 ± 41
1973	1	33	304 ± 17	303 ± 51	181	1.05 ± 0.15	495 ± 47
	3	42	297 ± 15	298 ± 37	284	0.86 ± 0.11	542 ± 43
	4	28	305 ± 22	296 ± 36	244	0.92 ± 0.12	521 ± 38
	6	36	250 ± 19	248 ± 21	304	0.68 ± 0.10	454 ± 35
1974	1	45	250 ± 20	280 ± 40	119	0.78 ± 0.19	372 ± 39

Standard deviations are presented after each mean.

TABLE 2: CORRELATION COEFFICIENTS BETWEEN VARIABLES

Year	*Test Centre*	*Start-wt and End-wt*	*Start-wt and Start Age*	*Start Age and Test Gain/day*	*Start-wt and Test Gain/day*	*End-wt and Test Gain/day*
1971	1	0.80***	0.43**	— 0.17	0.02	0.62***
	2	0.78***	0.21	— 0.42*	0.08	0.68***
	3	0.76***	0.44**	— 0.25	— 0.07	0.59***
	6	0.76***	0.19	— 0.003	— 0.04	0.62***
1972	1	0.50***	0.42***	— 0.59***	— 0.26*	0.71***
	2	0.49**	0.37*	— 0.52**	— 0.60***	0.39*
	3	0.71***	— 0.06	0.10	— 0.27	0.49**
	5	0.78***	0.67***	0.09	— 0.01	0.61***
	6	0.38*	0.57***	— 0.18	— 0.39*	0.70***
1973	1	0.85***	0.31*	0.09	— 0.40*	0.14
	3	0.71***	0.28	— 0.05	— 0.20	0.55***
	4	0.69***	0.28	0.01	— 0.32	0.47*
	6	0.54***	0.10	— 0.03	— 0.08	0.80***
1974	1	0.85***	0.64***	— 0.27	— 0.32	0.24
Pooled over years and centres		0.69	0.37	— 0.21	— 0.24	0.51

TABLE 3: PERCENTAGE OF BULLS WHICH WERE IN THE TOP 25% FOR START-WEIGHT AND WHICH REMAINED IN THE TOP 25% FOR END-WEIGHT AND TEST GAIN/DAY, RESPECTIVELY

Year	*Centre*	*No. Bulls on Test*	*End-weight*	*Test Gain/Day*
1971	1	39	80	20
	2	31	67	11
	3	34	88	38
	6	30	67	44
1972	1	65	44	19
	2	38	56	11
	3	35	44	11
	5	35	67	22
	6	30	57	14
1973	1	33	75	0
	3	42	60	30
	4	28	86	29
	6	36	77	33
1974	1	45	82	18

are high it is suggested that the heavy bulls at the end could have been picked at the start so the tests are invalid. However, the main aim of the breeders supporting these tests was to find the top individual stud sire for widespread use within the breed. The relationship between start-weight and end-weight (Table 3) could not guarantee this.

The question remains of whether the top-ranked bull on end-weight is genetically superior for this trait. These tests as presently organized cannot answer this question. The value of central performance test stations in identifying bulls of high breeding value for growth will only be firmly established when bulls which have been performance tested are then subsequently progeny tested. Work to investigate this relationship is being undertaken by the N.Z. Dairy Board. Extensive New Zealand data now show the persistent effects of pre-weaning environment on post-weaning growth in a common environment, and this questions the whole practice of central performance testing at any start-age after 3 to 4 months of age (Everitt *et al.*, 1969, 1975; Everitt, 1972; Reardon and Everitt, 1972; Smith *et al.*, 1973; Dalton *et al.*, 1975.

Baker *et al.* (1975) have confirmed the good relationship between the performance test ranking of a bull and his subsequent progeny test within a herd. This stresses the need for more within-herd performance testing and less central testing as presently organized.

The variations in costs and returns to the breeder of these central tests cannot be analysed. Although the genetic information coming from these tests at present may be limited, breeders appear to be benefiting from the extension and breed promotion aspects provided by the tests.

CONCLUSION

Angus central performance tests as presently organized in New Zealand provide very limited genetic information on bulls because of the large effects of pre-test environment. If the tests continue, start-age should not exceed 4 months of age which most breeders would find unacceptable. More emphasis should be placed on within-herd performance testing. Breeders now have to decide whether the costs of the tests are justified by the non-genetic benefits.

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