

WHAT THE JERSEY BULL PROVING SCHEME HAS TAUGHT US ABOUT THE WAY AHEAD

BY
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AN ASSESSMENT OF RESULTS AND
LESSONS LEARNED FROM THE PROGENY
TESTING OF YOUNG BULLS IN THE ISLAND
AND
THE PREDICTION OF RATES OF
GENETIC IMPROVEMENT IN MILK YIELD
FROM SEVERAL ALTERNATIVE BREEDING
PROCEDURES.

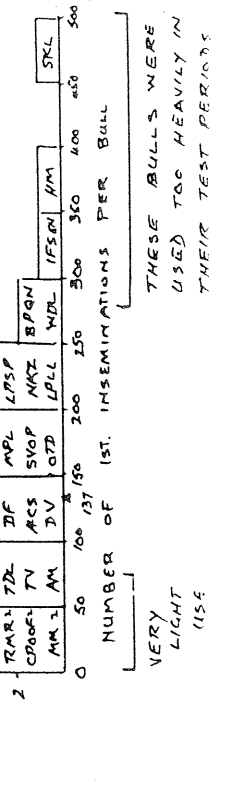
BASED ON A REMIT FROM THE
BREED IMPROVEMENT COMMITTEE
OF THE RJA & HS.

DISTRIBUTION OF TEST BULLS IN FIRST 5 GROUPS
ACCORDING TO NUMBER OF 1ST. INSEMINATIONS.

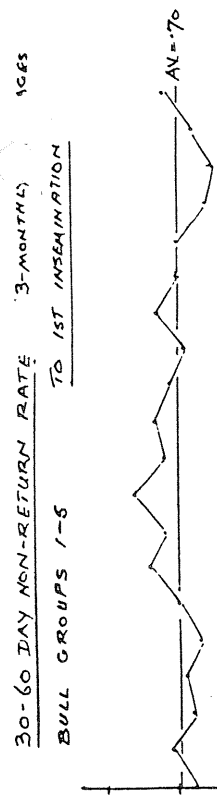
PATTERN OF BULL USAGE
GROUP 5 BULLS

THE VARIATION AMONG BULLS IN
EXTENT OF USE EXEMPLIFIED THE
PROBLEMS EXPERIENCED IN GETTING
10 YOUNG BULLS OF EQUAL P.F.
EACH YEAR.

AV. N° OF 1ST. INSEMS. PER GROUP



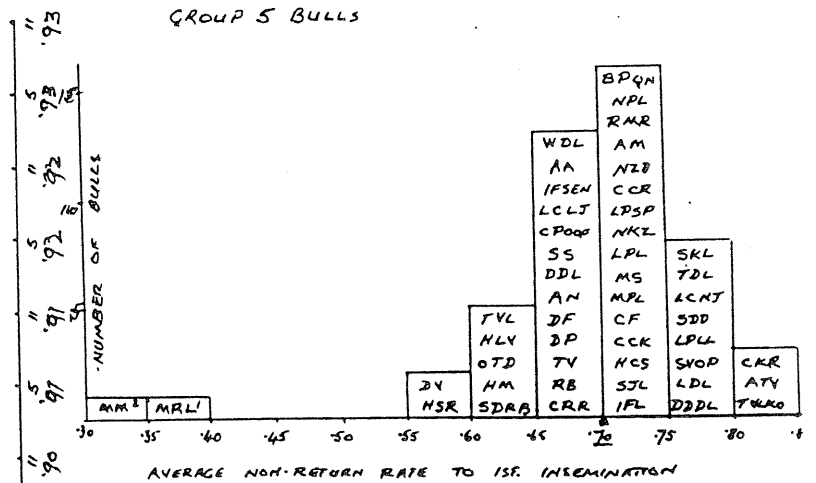
THESE BULLS WERE
USED TOO HEAVILY IN
THEIR TEST PERIODS



NON-RETURN RATES TO 1ST. INSEMINATION

FIRST 5 GROUPS OF TEST BULLS.

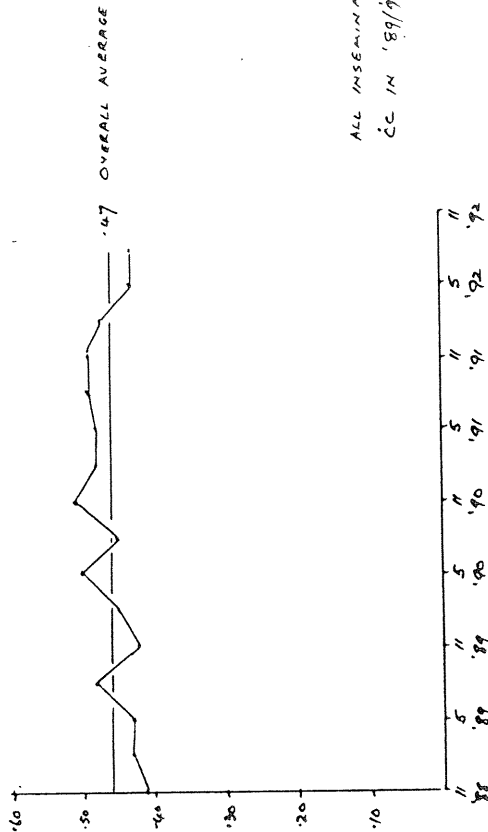
GROUP 5 BULLS



AVERAGE N/R RATE	GROUP	1	.69
	"	2	.69
	"	3	.75
	"	4	.71
	"	5	.67
	ALL		.70
			6718 1st. INSEMS.

CALVING RATE TO 1ST. INSEMINATION 3-MONTHLY AVERAGES

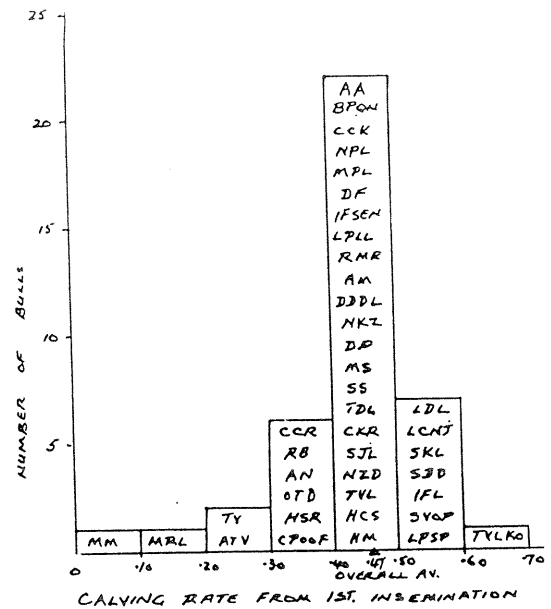
BULL GROUPS 1-4



7

BULL AVERAGES

GROUP 4 BULLS



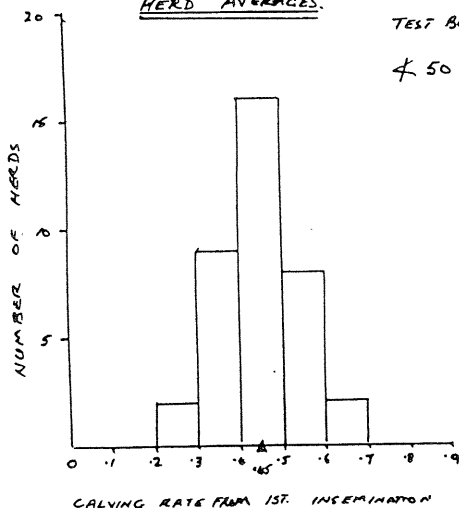
AVERAGE CALVING RATE:

GROUP	1	2	3	4	OVERALL
AVERAGE CALVING RATE	.43	.46	.49	.46	.47

8

CALVING RATE FROM 1ST. INSEMINATION.

HERD AVERAGES.



TEST BULL GROUPS 1-4
450 1ST. INSEMS. / HERD
37 HERDS

4718 1ST. INSEMS.

THE FACTS THAT,
BULLS DIFFER IN NON-RETURN RATE
" " " CALVING RATE
AND THAT,
FARMS DIFFER IN CALVING RATE
IN THE MANNER THAT THEY DO (NORMAL DISTRIBUTIONS.)
IS AN INDICATION THAT THE A.I. SERVICE IS NOT AT FAULT.

POSSIBLE REASONS FOR DIFFERENCES
BETWEEN HERDS IN CALVING RATE FROM
1ST. INSEMINATION.

- LOW COPPER AS A TRACE ELEMENT IN ITSELF.
- LOW COPPER AS A RESULT OF MGH FROM WHICH BINDS THE COPPER, MAKING IT UNAVAILABLE TO THE COW. (AND POSSIBLY OTHERS E.G. SELENIUM).
- PRESENTATION OF COWS FOR INSEMINATION SOONER THAN 42 DAYS AFTER CALVING.
- INACCURACIES IN DETECTION OF HEAT.
- TOO MUCH PROTEIN IN FEED IN THE FLUSH OF PRODUCTION IN EARLY LACTATION.
- PRESENCE OF LIVERFLUKE
- VENEREAL DISEASE (E.G. CAMPYLOBACTER) FROM NATURAL SERVICE BULLS CAUSING EARLY EMBRYONIC DEATH.

THE MAIN CAUSES OF HERD DIFFERENCES TEND TO BE FACULTY TO THE INDIVIDUAL HERD.

THERE SEEMS, THEREFORE, TO BE A NEED FOR A DETAILED STUDY OF EACH HERD BY A QUALIFIED ADVISER.

"BOTTOM LINE" OF
REPRODUCTIVE INFORMATION:-

1500 1ST INSEMS.
+ 2ND "
+ 3RD " } NVD 300 COMPLETED
1ST LACTATIONS

ie. A MAXIMUM POSSIBLE
REPLACEMENT RATE OF 20%
FOR ANY GIVEN PROPORTION
OF THE COW POPULATION

ASSUMING EQUAL
REPROD. EFFIC. OF } YOUNG BULLS ON TEST
AND
PROVEN SIRE

TYPE/CONFORMATION

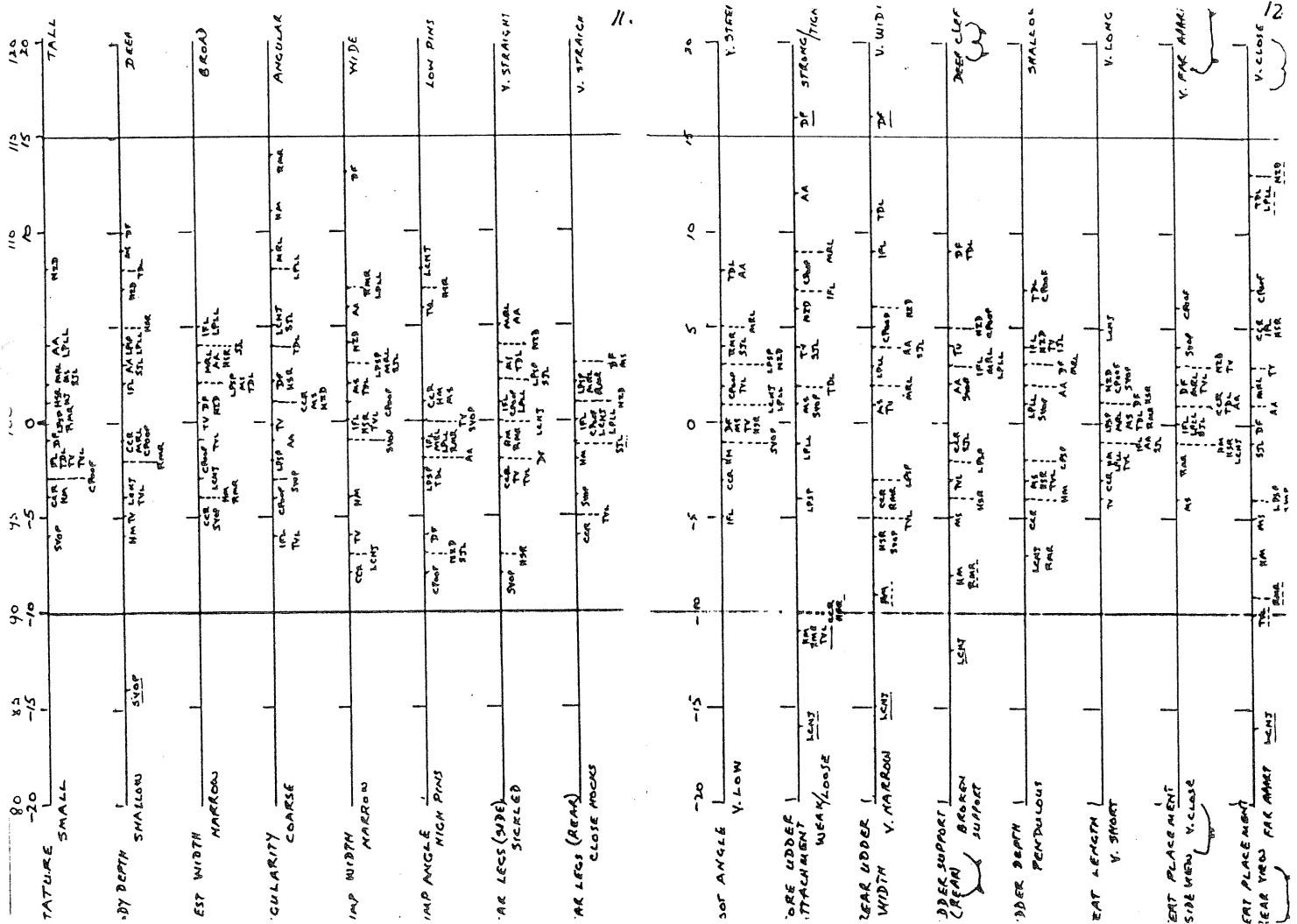
(i) HOW MUCH GENETIC VARIATION
IS THERE IN TYPE/CONFORMATION
IN THE ISLAND POPULATION?

(ii) IS GOOD CONFORMATION BEING
SACRIFICED IN THE JBPS?

(iii) CAN ANYTHING BE DONE ABOUT
THE LOSS OF HERD UNIFORMITY
AS A RESULT OF USING AT
LEAST 3 BULLS/YEAR?

NB

THE AVERAGE VALUE OF A SIRE-PROGENY GROUP
BEING A GROUP OF HALF-SISTERS,
= HALF THE BREEDING VALUE OF THE SIRE
FOR THE TRAIT
AND IS, THEREFORE,
A GENETIC VALUE.

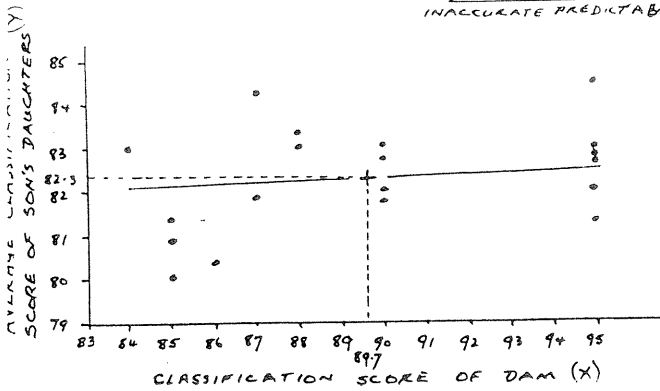


RELATIONSHIP BETWEEN DAM'S SCORE AND AVERAGE SCORE OF SON'S DAUGHTERS.

BULL GROUPS 1 & 2.

$$Y = 73 + .10X$$

INACCURATE PREDICTABILITY



"IS GOOD CONFORMATION BEING SACRIFICED IN THE JBPS?"

THERE IS NO INDICATION OF THIS IN THE COMPONENTS OF CONFORMATION (PREVIOUS 2 O/K'S) WHERE THE DAUGHTER-GROUP AVERAGES ARE EXPRESSED AS DEVIATIONS FROM BREED AVERAGE

HERE THE AVERAGE SCORE OF THE DAMS IS 89.7 AND THAT OF THE SONS' DAUGHTERS IS 82.3. BREED AV. = 82.1

NO GOOD CONFORMATION IS NOT BEING SACRIFICED

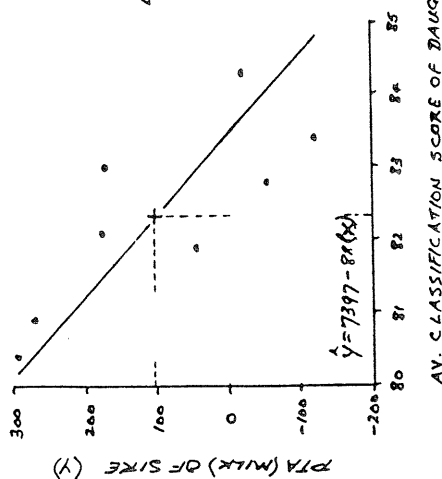
BULL DAMS HAVE BEEN RE-SCORED AND SELECTED WHILE THE GRAND-DAUGHTERS HAVE

STRONG -VE RELSHIP.
NOT EASY TO FIND
BULLS WHO BREED
BOTH GOOD PRODN.
AND GOOD TYPE.

HM 296
CCR 273
MS 179
TV 176
LPSP 44
TDL 18
IFL -52
NZD -119

HM 80.4
CCR 80.9
MS 82.1
TV 83.0
LPSP 81.9
TDL 84.3
IFL 82.3
NZD 83.4

RELATIONSHIP BETWEEN PTA (MILK) OF SIRE AND AV. CLASSIFICATION SCORE OF DAUGHTERS



GDR	2	1	3	7
MG	4	3		7
CPV	2			2
FE	1	2	5	22
FOB	1			1
SDC	5	10	6	7
MDL	5	2	13	1
BRM	1			7
OOP	1	6		1
LMGV		2		2
ITF				3
EDD			1	4
ROT			1	3
ITF			3	1
SRD			1	14
POG			4	1
AVV			7	6
TVB			3	3
DM(1)			2	4
MS(1)			1	1
LPSP(1)			2	2
MDL			2	1
DF(1)			2	1
OCC			1	12
TDL(1)			10	1
LPFL(2)			1	1
EVOP(2)			1	1
MDL(2)			1	1
AA(2)			1	2
OKD			1	1
ORD			1	1
ASAV			1	10
CCK(3)			9	6
IPS(3)			4	8
EDD(3)			4	1
SKL(3)			1	1
ESR(2)			1	2
CSP			1	10
AM(4)			9	8
AO			2	5
MPL(4)			5	3
MKS(4)			2	3
SVA			1	5
POM			2	5
TOTALS	25	27	18	230
NO. BULLS	10	8	5	23

45 BULLS CONTRIBUTED 230 DAUGHTERS IN 9 YEARS

IT IS DIFFICULT TO SEE HOW UNIFORMITY OF TYPE COULD HAVE EXISTED WHEN SO MANY BULLS WERE USED PRIOR TO THE INCEPTION OF THE SCHEME.

PRODUCTION

(i) HOW DO THE AVERAGES OF THE COMPONENTS OF PRODUCTION IN THE ISLAND COMPARE WITH THE AVERAGES IN ENGLAND?

MILK (KGS. PER LACTATION)

	ISLAND	ENGLAND	DIFFERENCE
'89/90	4073	4163	
'90/91	4090	4262	
'91/92	4218	4327	
Av.	4127	4250	-123

BUTTERFAT (KGS. PER LACTATION)

	ISLAND	ENGLAND	
'89/90	218	224	
'90/91	226	232	
'91/92	228	238	
	224	231	-7

PROTEIN (KGS. PER LACTATION)

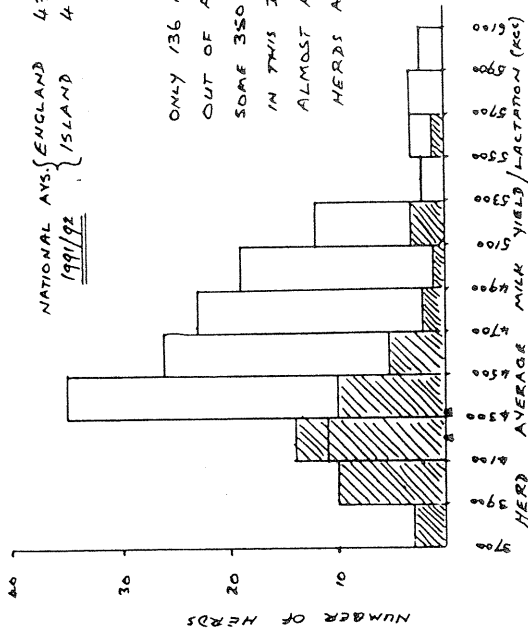
	ISLAND	ENGLAND	
'89/90	161	160	
'90/91	162	164	
'91/92	163	166	
	162	163	-1

HERD AVERAGE MILK YIELD (2X MILKING)

LEADING HERDS IN ENGLAND AND IN THE ISLAND

NATIONAL AVE. ENGLAND 4327 } 109 KG.
1991/92 ISLAND 4218 }

ONLY 136 MAINLAND HERDS
OUT OF A TOTAL OF
SOME 350 ARE REPRESENTED
IN THIS DISTRIBUTION.
ALMOST ALL THE ISLAND
HERDS ARE REPRESENTED
(52)



AWAITING MORE
MILK DATA

PRODUCTION

WHAT IMPROVEMENTS HAVE BEEN MADE IN COMPONENTS OF PRODUCTION IN THE ISLAND OVER THE PAST 22 YEARS AND HOW DO THE RATES OF GENETIC IMPROVEMENT COMPARE WITH THOSE IN ENGLAND?

TOTAL INCREASE IN MILK/LACT. ≈ 900 KG.
" " BF " ≈ 63 KG.

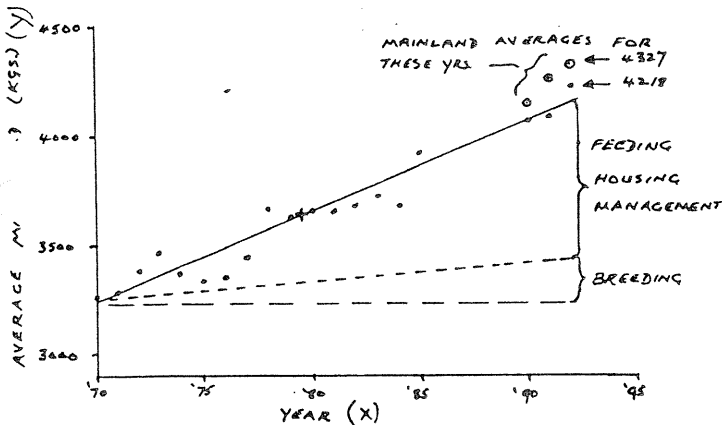
THESE ARE BOTH OBSERVED INCREASES AND ARE DUE TO IMPROVEMENTS IN:

FEEDING
HOUSING
MANAGEMENT
BREEDING

WHAT, THEN, ARE THE RATES OF GENETIC IMPROVEMENT?

ISLAND AVERAGE MILK YIELD (KGS/LACTATION) 19.
1970 TO 1992

$$\hat{y} = 417 + 40.3X$$



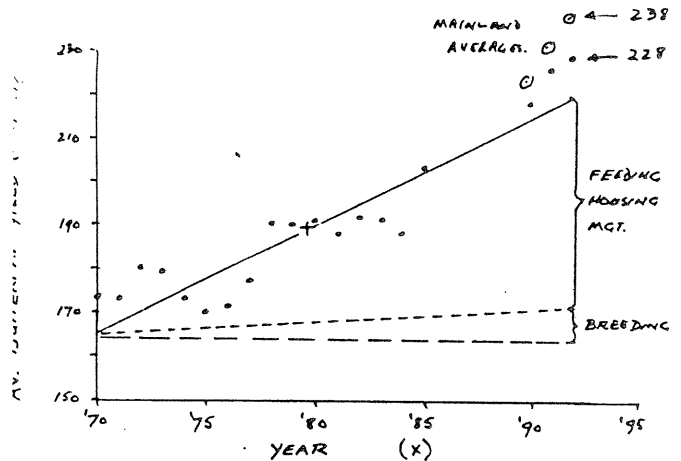
THE TOTAL OBSERVED IMPROVEMENT OVER 22 YEARS
 ≈ 900 KG. MILK
 ≈ 40 KG. MILK/YEAR

THE ESTIMATED GENETIC IMPROVEMENT IS
22% PER YEAR (MRODE ET AL. 1991)
 ≈ 190 KG. MILK IN 22 YRS.
 ≈ 8.8 KG. " PER YR.

THE ESTIMATED GENETIC IMPROVEMENT IN
MAINLAND JEREYS HAS BEEN ABOUT
TWICE THAT IN THE ISLAND.

ISLAND AV. BUTTERFAT YIELD (KGS/LACTATION) 20.
1970 TO 1992

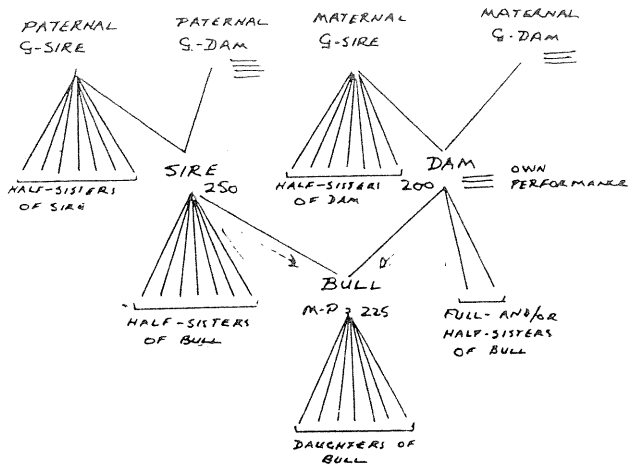
$$\hat{y} = -6.3 + 2.46X$$



THE TOTAL OBSERVED IMPROVEMENT OVER 22 YEARS
 ≈ 63 KG. BUTTERFAT
 ≈ 2.9 KG. BFAT/YEAR

THE ESTIMATED GENETIC IMPROVEMENT IS
25% PER YEAR (MRODE ET AL. 1991)
 ≈ 10 KG. BFAT IN 22 YRS.
 ≈ 0.45 KG. " PER YR.

AGAIN, THE ESTIMATED GENETIC IMPROVEMENT IN
MAINLAND JEREYS HAS BEEN ABOUT
TWICE THAT IN THE ISLAND.



PTA OF YOUNG BULL = AV. OF PARENTAL PTA'S
= MID-PARENT VALUE (225)
(RELATIVELY LOW RELIABILITY)

WHEN HE BEGETS DAUGHTERS AND THEIR N²
INCREASE, SO HIS PTA IS DETERMINED
INCREASINGLY BY THEIR PERFORMANCE AND
DECREASINGLY BY THE PARENTAL PTA'S.

RELIABILITY INCREASES WITH N² OF DAUGHTERS.

A PTA IS AN ON-GOING, PREDICTION OF
TRANSMITTING ABILITY, WEIGHTE BY USING
THE MOST MEANINGFUL INFO. FROM ALL RELATIVE:

SONS OF
ELLERDINE
CINDY'S
SNOWBALL
50922 +216
-6
80
84
171
153
173
204
+116

SONS OF
FAIRWAY
DESIGN'S
GOVERNOR
51296 -172
-274
-169
-165
-119
-106
-89
-85
-55
25
-115

SONS OF
MEADOW LAWN
BRIGHT SPOT
135196 +426
87
93
103
131
135
142
157
167
176
176
181
181
183
185
187
218
239
266
274
302
350
378
392
199
19

SONS OF
FERDON GLEN'S
CORONET
(5084) -32
-241 23
-219 35
-214 36
-187 43
-161 58
-148 75
-147 86
-126 88
-111 90
-79 103
-73 127
-61 -33
-53
-40
-40
-31
-28
-27
-18
-3
-1
13
14
19
19

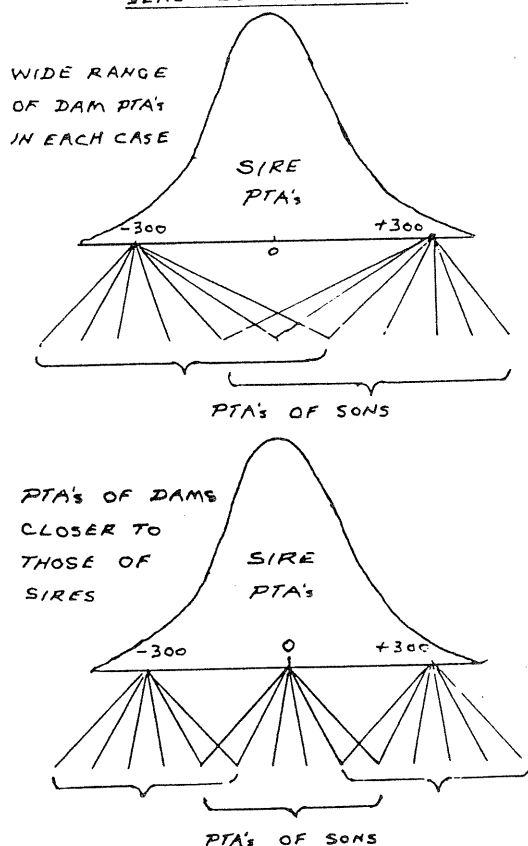
SONS OF
DREAMING
DAZZLES
DESIGNER
(50645) -253
-361
-307
-301
-219
-206
-204
-171
-169
-158
-84
-218

PTA'S OF SONS OF
A GIVEN SIRE VARY.
(DAMS, REL, MENDELIAN
SEGREGATION OF GENES)
THEIR AVERAGE PTA
IS SIMILAR TO THE
OF THEIR =
BUT NOT AS
EXTREME — THEY
TEND TO "REGRESS"
TOWARDS ZERO, THE
OVERALL AVERAGE

23.

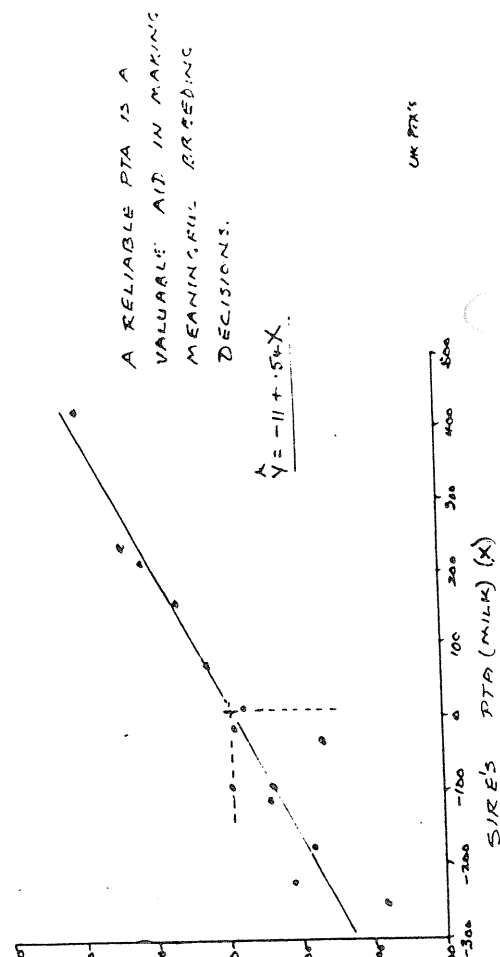
24.

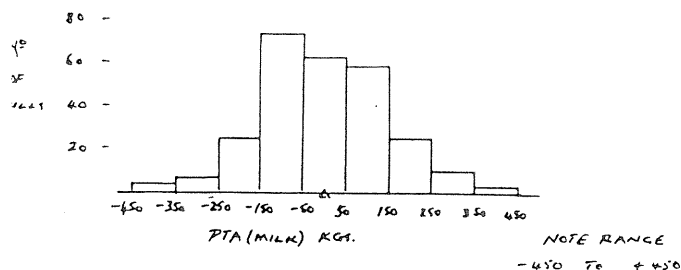
VARIATION IN PTA'S OF SONS DUE TO
DIFFERENCES IN DAMS, RELIABILITIES AND
GENE SEGREGATION



PTA (MILK)

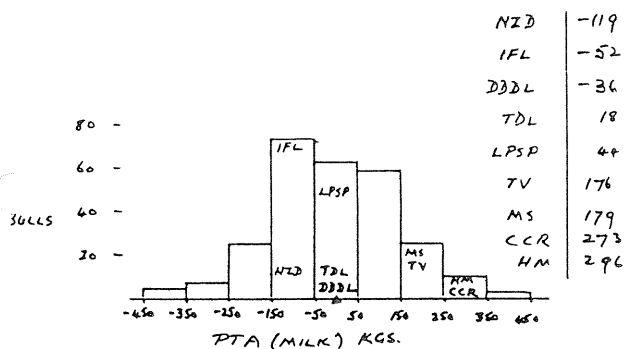
RELATIONSHIP BETWEEN THE PTA OF A SIRE
AND THE AVERAGE PTA OF HIS SONS.



PTA (MILK) KGS.

ALL ISLAND BULLS TO DATE (265)

INCLUDING DISTRIBUTION OF PTA'S OF 8 GROUP 1 BULLS AND 1 GROUP 3 (OLDER) BULL, (DDDL)



27.

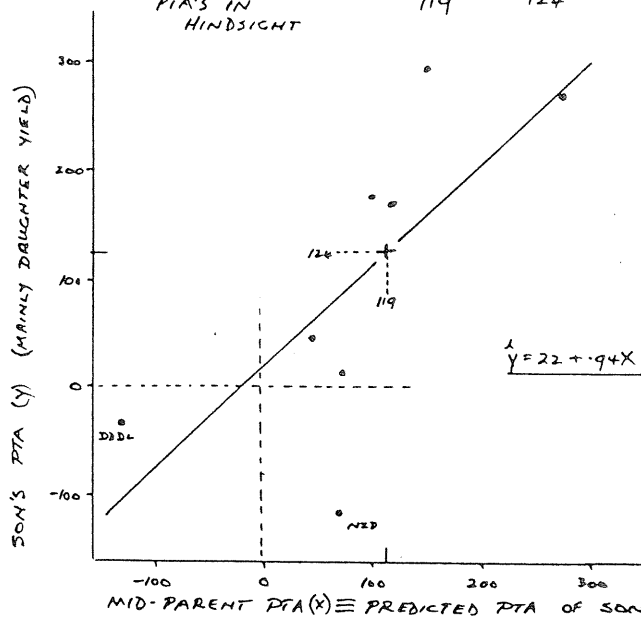
PTA (MILK)PTA OF MID-PARENT $\equiv$ PREDICTED PTA OF SON

YOUNG BULLS WITH GOOD BREEDING PROMISE.

GR.	BULL	SIRE'S PTA	DAM'S PTA	M-P PTA
2	SVOP	152	235	194
3	RB	218	192	205
4	BPON	143	307	225
4	MPL	275	144	210
4	NPL	275	148	212
6	CSL	178	213	196

MID-PARENT PTA AND SON'S PTA.

SIRE	DAM	MID-PARENT	SON	BULL
267	281	274	273	CCR
53	246	150	296	HM
-54	142	44	44	LPSP
56	144	100	179	MS
-127	266	70	-119	NZD
-75	220	72	18	TDL
-62	304	121	176	TV
-175	-91	-133	-36	DDDL
PTA'S IN HINDSIGHT		119	124	



28.

PTA (MILK)PTA OF MID-PARENT $\equiv$ PREDICTED PTA OF SON

SOME YOUNG BULLS WHOSE BREEDING PROMISE COULD HAVE BEEN FAR BETTER HAD EACH ONE NOT HAD ONE POOR PARENT.

GR.	BULL	SIRE'S PTA	DAM'S PTA	M-P PTA
2	RMR	267	-6	130
3	ATV	81	230	156
3	SDD	9	312	160
4	AM	-81	354	136
4	CKR	262	-10	126
6	POW	294	24	159
6	RD	-15	224	104
6	CRF	192	93	142

IN FAIRNESS, IT MUST BE SAID THAT PTA'S WERE NOT AVAILABLE AT THE TIME OF PLANNING THE MATINGS FOR THESE BULLS.THE INFORMATION WAS IN THE FORM OF ICC'S AND COW PRODUCTION INDICES.

PTA (MILK)

PTA OF MID-PARENT $\equiv$ PREDICTED PTA OF SON

SOME YOUNG BULLS WHO SHOULD NOT HAVE BEEN ENTERED FOR TEST

SP.	BULL	SIRE'S PTA	DAM'S PTA	M-P PTA
2	LPL	-18	86	34
3	DP	32	39	36
3	LDL	-226	221	-25
4	NKI	-119	227	54
5	CRR	-191	290	50
5	DV	107	-137	-15
5	HLV	77	75	76
5	LPL	-18	57	20
5	WR	-70	36	-17

DIFFICULTY HAS APPARENTLY BEEN EXPERIENCED IN FINDING A SUFFICIENT NUMBER OF POTENTIAL PARENTS IN EACH YEAR WHICH MEET BOTH TYPE AND PRODUCTION REQUIREMENTS.

31

APPRX. AGE OF DAM AT THE TIME OF MATING TO PRODUCE A SON FOR TEST.

AGE OF DAM	1	2	3	4	5	6	
2-2-11					1	1	1
3				2	1	1	3
4			1	1	1	1	4
5	2	1	1		3	2	9
6	2	2	2	1		1	8
7	3	1		3		1	8
8-8-11			2		2		4
9	1	2					3
10	1		1	1	1	2	6
11				2	1	1	4
12-12-11		1	1		1		3
13		1	2			1	4
14		1					1
15	1						1
16-16-11		1					1
AV.	8-2	10-0	8-9	7-7	7-2	7-9	8-3

AV. AGE OF COWS IN THE ISLAND $\approx$ 7 YEARS (46 LACTATIONS)

IE. MANY OLDER COWS HAVE BEEN USED AS BULL DAMS - GREATER RELIABILITY OF YIELD PERFORMANCE AND A DESIRE NOT TO LOSE THE GENES RESPONSIBLE FOR THEIR PERFORMANCE

AGE OF BULL DAMS WILL PROBABLY BE REDUCED IN FUTURE.

PTA (MILK)

PTA OF MID-PARENT $\equiv$ PREDICTED PTA OF SON

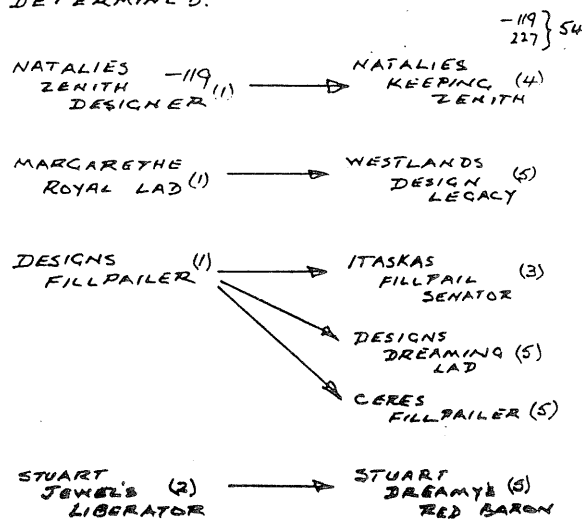
PLANNED MATINGS FOR GROUP 7 BULLS { PARENTAL PTA'S AVAILABLE

SP.	BULL	SIRE'S PTA	DAM'S PTA	M-P PTA	
7	A	198	67	132	
7	B	274	140	207	
7	C	272	115	194	
7	D	255	233	244	
7	E	296	294	295	
7	F	255	96	176	SIRE AV. = 237
7	G	181	113	147	DAM AV. = 125
7	H	192	114	153	M-P = 181
7	I	294	120	207	
7	J	350	127	238	
7	K	274	98	185	
7	L	274	167	220	
7	M	181	74	128	
7	N	255	70	162	
7	O	121	92	108	
7	P	121	93	107	

NOT ALL THESE MATINGS WILL YIELD BULL CALVES, BUT THERE IS CONSIDERABLY MORE PROMISE HERE. IT MAY BE POSSIBLE IN FUTURE TO IMPOSE A MINIMUM PTA OF 200 ON ALL DAMS AND 250 ON ALL SIRE'S.

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YOUNG TEST BULLS HAVE BEEN USED AS SIRE'S OF FURTHER TEST BULLS BEFORE THEIR OWN BREEDING ABILITY HAS BEEN DETERMINED.



STAR KEEPER'S LAD (3) → ANSON GIGLO (6)

LA CAROLINE NURIEL'S JESTER (2) → LA CAROLINE LORD'S JESTER (5)

THESE WERE APPARENTLY NOT THE RESULT OF CONTRACT MATINGS ARRANGED BY THE B.I.C., BUT RATHER BREEDER DECISIONS ABOUT "BULLS ON

IS THERE A DANGER OF TOO MUCH
INBREEDING AS A RESULT OF THE
J.B.P.S.?

- IF THE BREED IMPROVEMENT COMMITTEE
CONSIDERS INTER-RELATIONSHIPS WHEN
PLANNING CONTRAST MATINGS,
(USING FULLY MAINTAINED STRUCTURAL
PENRAGES),
- IF BREEDERS DO NOT CONCENTRATE
ON USING TOO FEW PROVEN BULLS,
(SET UP AND MAINTAIN MEANINGFUL
BULL SUMMARIES OF PATTERN OF USAGE
— N° OF DAUGHTERS AND N° OF BREEDING
SONS FROM EACH),
- IF THE EFFECTS OF BULL USAGE ON
THE STRUCTURE OF THE CATTLE
POPULATION ARE MONITORED,
(AT 5-YEARLY INTERVALS),

THEN, NO, THERE IS VERY LITTLE
DANGER OF TOO MUCH INBREEDING.

BUT WHEN THE ABOVE IF'S ARE
IGNORED, THE DANGER OF INBREEDING
WILL BE UNEXPECTEDLY LARGE.

THE COEFFICIENT OF INBREEDING IN ANY
ANIMAL IMPROVEMENT SCHEME WILL
TEND TO INCREASE AS A RESULT OF
SELECTING THE BEST COWS AND BY
USING THEM TO BREED SONS FROM THE
BEST PROVEN Sires

THEREFORE, START WITH AS WIDE A
GENETIC BASE AS POSSIBLE —
ESPECIALLY IN A SMALL COW-
POPULATION, AS IN THE ISLAND.

INBREEDING IS BECOMING A PROBLEM
IN THE U.S. JERSEY POPULATION* AND
IN THE U.S. HOLSTEIN-FRIESIAN POPULATION,
"QUITE DRAMATICALLY"

THE ANIMAL DATA CENTRE IS MONITORING
THE SITUATION IN THE HOLSTEIN-FRIESIAN
POPULATION OF THE UK.

MOFFIT: "..... CONFIRMS MY OWN CONCERN
ABOUT THE GENERAL NARROWING
OF THE WORLD'S BLACK-AND-WHITE
GENETIC BASE."

* JERSEY JOURNAL (Am. J.C.C.) SEPT. '93
"WATCH OUT FOR INBREEDING" MCDANIEL

35

THE WAY AHEAD?

THERE ARE SEVERAL
ALTERNATIVE BREEDING PROCEDURES
AND WE CAN PREDICT THE
RATE OF GENETIC IMPROVEMENT
IN MILK PRODUCTION FOR EACH.

EXPECTED RATE OF GENETIC IMPROVEMENT
FROM CONTINUED USE OF THE J.B.P.S.
WITHOUT IMPORTATION

AVERAGE PTA (MILK) OF Sires = +250 }
" " " " DAMS = +200 }
∴ AVERAGE MID-PARENT PTA = +225
20% REPLACEMENT RATE
∴ EXISTING COW POPULATION WILL BE
EFFECTIVELY REPLACED AFTER 11 YEARS
= 5 COMPLETE CYCLES.

EXPECTED INCREASE IN BREED AY. OVER 11 YEARS
= 178 KGS WHICH IS = 16.2 KGS. PER YR. ON AV.
CURRENT HEIFER EQUIVALENT = 4000 KGS.
∴ EXPECT A GENETIC IMPROVEMENT OF
0.4% PER YEAR, ON AVERAGE.

THIS EXPECTATION ASSUMES THE FURTHER
USE OF BULLS IDENTIFIED BY THE
PROVING SCHEME TO HAVE SUPERIOR
PTA'S FOR MILK YIELD.

THE 8 GROUP 1 BULLS RANGE IN
PTA (MILK) FROM -119 TO +296 WITH
AN AVERAGE OF +100

THERE ARE A FURTHER 50 BULLS
"IN THE PIPELINE".

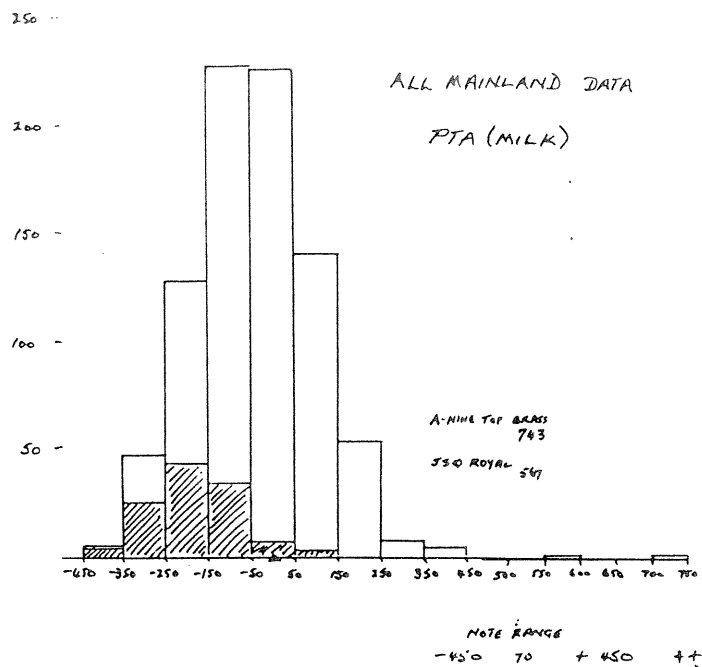
36.

WERE SEMEN TO BE IMPORTED,
IT WOULD PROBABLY COME FROM
THE U.S.A., CANADA AND, POSSIBLY,
NEW ZEALAND.

THE ONLY COUNTRY WITH WHICH THE
ISLAND HAS AN INTERNATIONAL
PTA CONVERSION IS THE U.K.
MAINLAND.

WE MUST, THEREFORE, USE THIS
AS A BASIS FOR OBTAINING AN
ISLAND EQUIVALENT PTA (MILK).

IN THIS WAY WE CAN SPECIFY
THE PROBABLE GENETIC SUPERIORITY
OF IMPORTED SEMEN.

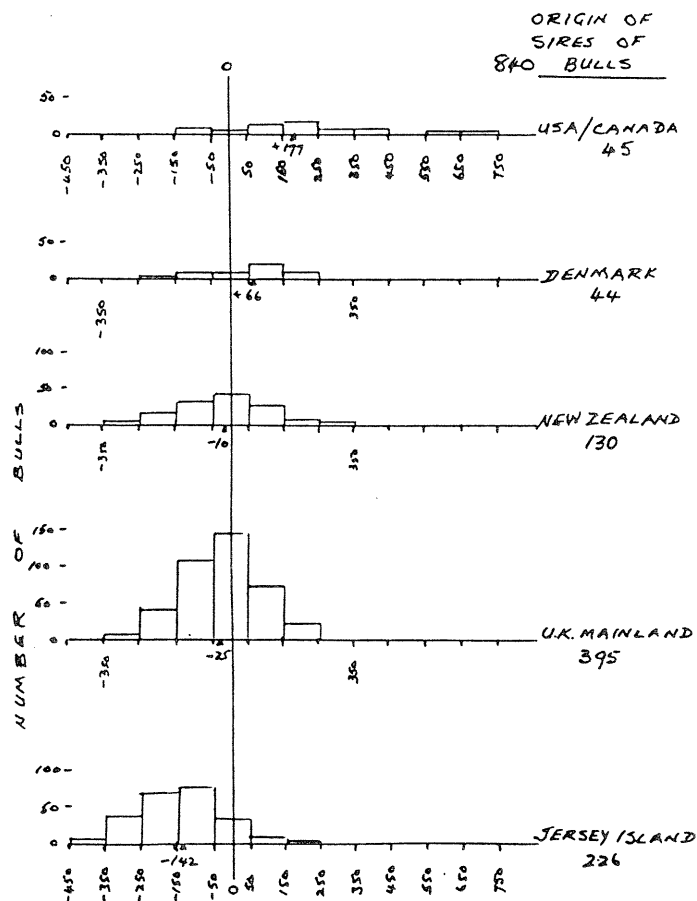


840 MAINLAND BULL PTA'S INCLUDING
IMPORTED BULLS AND IMPORTED SEMEN AND
INCLUDING 114 ISLAND BULLS WITH
MAINLAND PTA'S

PTA (MILK)

DISTRIBUTIONS OF PTA'S OF BULLS WITH
DAUGHTERS IN THE U.K.

39.



RECOMMENDED PROCEDURE IF SEMEN IS IMPORTED

40.

1. NUMBER OF BULLS TO BE REPRESENTED = 20
SPREAD OVER 4 YEARS i.e. 5 PER YEAR TO
ENSURE A BROAD GENETIC BASE, THEN CLOSE.

CURRENT U.S.A. SITUATION:-

8 "HIGHLY RELATED" BULLS CONTRIBUTE 6
OF THE GENES IN REPLACING THE COW
POPULATION.

2. NEED FOR CONTROLLED MATINGS TO ENSURE
THE SPREAD OF THE IMPORTED GENES AND
TO ASSESS THE TRANSMITTING ABILITIES OF
SONS BEFORE USING THEM FURTHER.

3. AT LEAST 2 SONS, BY DIFFERENT DAMS, FROM
EACH IMPORTED "SIRE". (ENSURE BY ET?)
(i.e. 10 SONS FROM 5 SIRE'S PER YEAR.
(VARIATION AMONG SONS OF ANY GIVEN SIRE).

4. FOLLOW THE SAME PATTERN OF USE
OF SONS OF IMPORTED "SIRE'S" AS IN
THE JERSEY BULL PROVING SCHEME.
PROBABLY ALL COWS WOULD BE MATED TO
THE SONS.

5. ISLAND BULLS COULD BE INCLUDED IF
SO DESIRED

EXPECTED RATE OF GENETIC IMPROVEMENT
FROM USING IMPORTED SEMEN

ASSUME AVERAGE PTA (MILK) OF IMPORTED SEMEN (MAINLY FROM U.S.A. AND CANADA) WITH A U.K. MAINLAND BASIS OF +600

LET ISLAND EQUIVALENT OF THIS = +750

LET AVERAGE PTA (MILK) OF DAMS = +200

∴ AVERAGE MID-PARENT PTA = +475

WHICH IS ≡ EXPECTED PTA OF SONS

20% REPLACEMENT RATE

∴ COW POPULATION WILL BE EFFECTIVELY REPLACED AFTER 11 YEARS = 5 COMPLETE CYCLES, ALL COWS BEING MATED TO SONS FROM IMPORTED SEMEN.

EXPECTED INCREASE IN BREED AV. OVER 11 YEARS = 369 KGS. WHICH IS ≡ 33 KGS. PER YR. ON AV.

CURRENT HEIFER EQUIVALENT ≈ 4000 KGS.

∴ EXPECT A GENETIC IMPROVEMENT OF

0.82% PER YEAR ON AVERAGE.

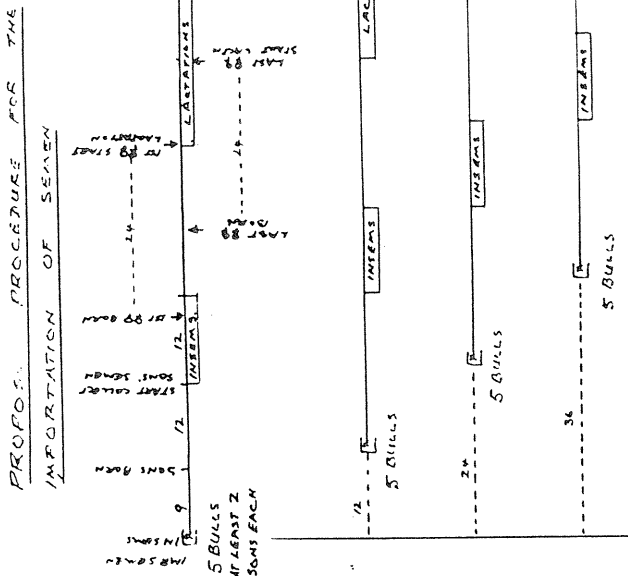
THE RATE OF GENETIC IMPROVEMENT IN THE U.K. BLACK-AND-WHITE DAIRY POPULATION OVER THE PAST 15 YEARS HAS BEEN ABOUT 0.5% PER YEAR.

(SWANSON, REPORTED BY TAYLOR).

AV. ANNUAL RATE OF GENETIC IMPROVEMENT

OBSERVED OVER PAST 22 YRS.	0.22%	8.5 KGS.
EXPECTED WITHOUT IMPORTING	0.4%	16 KGS.
EXPECTED WITH IMPORTED SEMEN	0.82%	33 KGS.
EXPECTED WITH IMPORTED EMBRYOS	1.3%	52 KGS.

I HOPE THE FOREGOING INFORMATION AND PREDICTIVE QUANTIFICATION WILL HELP YOU TO DECIDE ABOUT THE WAY AHEAD.



43.

44.

THE BREED IMPROVEMENT COMMITTEE HAVE ALSO ASKED FOR AN EXPECTED RATE OF GENETIC IMPROVEMENT FROM USING IMPORTED EMBRYOS RATHER THAN IMPORTED SEMEN. (5 BULLS X 10 COWS)

ASSUME AVERAGE PTA (MILK) OF IMPORTED EMBRYOS (MAINLY FROM U.S.A. AND CANADA) WITH A U.K. MAINLAND BASIS OF +600

LET ISLAND EQUIVALENT OF THIS = +750

AND THIS WILL BE SO FOR BOTH SIRE'S AND DAMS.

∴ AVERAGE MID-PARENT PTA = +750

WHICH IS ≡ EXPECTED PTA OF SONS

20% REPLACEMENT RATE

∴ COW POPULATION WILL BE EFFECTIVELY REPLACED AFTER 11 YEARS = 5 COMPLETE CYCLES, ALL COWS MATED TO IMPORTED BULLS.

EXPECTED INCREASE IN BREED AV. OVER 11 YRS.

= 570 KGS WHICH IS ≡ 52 KGS. PER YR. ON AV.

CURRENT HEIFER EQUIVALENT ≈ 4000 KGS

∴ EXPECT A GENETIC IMPROVEMENT OF

1.3% PER YEAR ON AVERAGE.