

THE DAIRY INDUSTRY IN ISRAEL 2003



Israel Cattle Breeders Association



Israel Dairy Board

The Dairy Industry in Israel 2003

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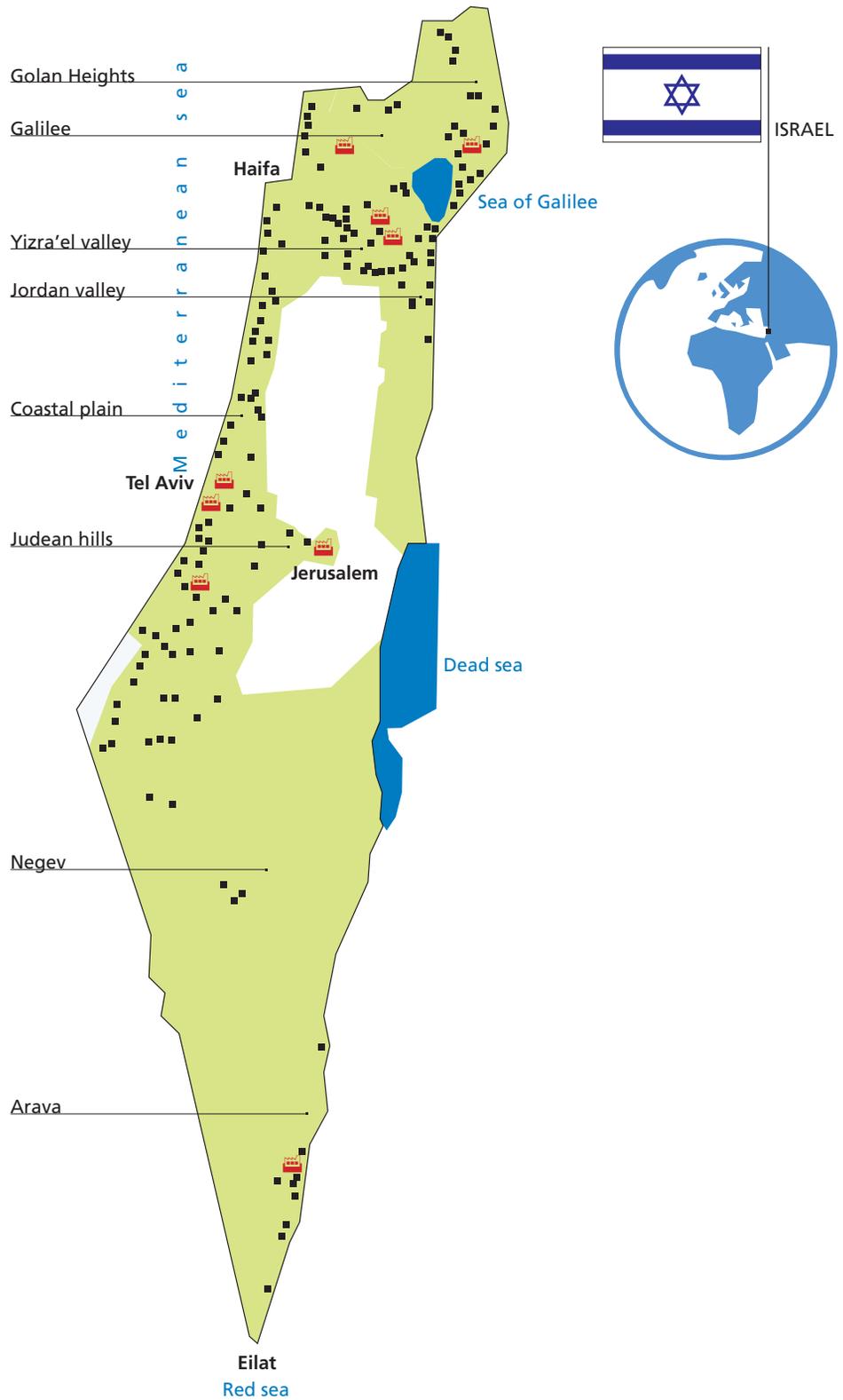
Contents

Part 1	The Israeli Dairy Industry	
	Map of the Dairy Industry in Israel	4
	The Israeli Dairy Industry	5
	Israel's Agriculture	6
Part 2	Milk Production in Israel	
	The Israeli Dairy Board.– <i>Liron Tamir</i>	7
	No. of dairy farms and annual milk quota	8
	Cow milk – Annual supply and quota	9
	Milk quality	10
	Milk quality through years	11
	Sheep & Goat milk – Annual production	12
	Marketed milk, by dairy products	13
Part 3	The Israeli Herdbook	
	The Israel Cattle Breeders Association – <i>Yossi Malul</i>	14
	The ICBA Database – <i>Ephraim Ezra</i>	15
	Production summary for 2003	
	Production averages by calving year	18
	Production averages, by parity number	19
	20 Cooperative herds with highest production	20
	20 Family herds with highest production	21
	20 Cows with highest production	22
	20 Cows with highest lifetime production	23
	NOA – The Israeli Dairy Herd Management Program – <i>Boaz Hanochi</i>	24
	Genetic Improvement	
	The Israeli Selection Index – <i>Ephraim Ezra / Joel I. Weller</i>	26
	The Israeli Breeding Program – <i>Yoel Zeron</i>	27
	Genetic Trends – average Breeding Value of cows	29
	Genetic Trends – average Breeding Value of bulls	31
	Bulls that performed largest number of inseminations	32
	Avsha – an outstanding Israeli Bull	33
	Fertility Statistics	
	Average Conception Rate at 1 st service, by years	34
	Fertility summary for 1 st lactation cows	35
	Fertility summary for adult cows	36
	Fertility and Production	37
	Hahaklait Veterinary Services	38

Part 1 The Israeli Dairy Industry

Map of the Dairy Industry in Israel Main Dairy Plants and Dairy Farms

-  Dairy Plants
-  Dairy Farms



The Dairy Industry in Israel

The dairy industry is one of the main sectors of Israeli agriculture, and supplies nearly the entire domestic demand for dairy products. Israel has a total annual output of approximately 1,125,000 tons of cow's milk; 9,950 tons of sheep's milk; and 5,140 tons of goat's milk.

Milk is processed into more than 1,000 different dairy products, with an annual value of approximately \$1.5 billion.

Milk is produced on over 1,000 farms, spread countrywide (in the mountains, the valleys and the desert) on kibbutzim (cooperatives) and moshavim (family farms).

Israel has about 110,000 cows, nearly all of the Israeli Holstein breed. The Israeli Holstein breed has been adapted through selection to the Israeli climate, characterized by a long and hot summer. Nearly all the cows are bred by A.I.

The Israeli Herdbook receives and processes information directly from the farmers, from the udder health laboratories, the Sion A.I. company, the dairies, and the official milk recording system, which includes 90% of the milking cows. The Israeli Herdbook provides the farmers with multi-disciplinary information that is used for management decisions. The Israeli cow has the highest mean milk yield and milk solid yield in the world. In 2003, the average annual milk yield per cow was 10,426 kg of milk, 325 kg of protein and 364 kg of fat.

We are pleased to present you with this summary of the Israeli dairy industry for 2003, and hope that this brochure will help acquaint you with this advanced and successful branch of Israeli agriculture.

Sincerely,



Shayke Drori
Israel Dairy Board
General Manager



Meir Brawn
Israel Cattle Breeders Association
General Manager

Table 2.1

➤ **Israel and its agricultural sector**

Population	6.75 million inhab.
GDP per capita (\$US)	16,100
GDP of agricultural sector (\$US)	1.6 billions
Share of agriculture in national GDP	1.5%
Share of agriculture in the business sector GDP	2.1%
Direct employment in agriculture, as share of national labor force	2.5%
Self-sufficiency in agricultural products	80.0%

Table 2.2

➤ **Marketing value of agricultural products Value as received by producer (NIS* millions)**

Crops	9,662	60 %
Livestock and livestock products	6,379	40 %
TOTAL	16,041	100 %
Raw milk (% of Total)	1,812	11 %

* 1 \$US= NIS 4.5483

Israel's agricultural sector is characterized by an intensive production system, which stems from the need to overcome the scarcity of natural resources, particularly water. The agricultural sector's high level of development is due to the close cooperation and interaction between scientists, extension advisers, farmers, and agriculture-related industries. These four elements have joined together to promote advanced technologies in all agricultural branches. The result is modern agriculture in a country, half of which is defined as

desert. Despite the decrease in the number of farmers and agriculture's share in the GDP, agriculture plays a significant role as a major food supplier to the local market and is an important factor in Israeli export. Total agricultural produce in 2003 accounted for 1.5% of the GDP.

Some 62,000 people were directly employed in agriculture in 2003. This number represents 2.5% of the country's total labor force. The average monthly income per agricultural employee was \$1,530 in 2003.



The Israel Dairy Board — Liron Tamir*



Part 2 Milk Production in Israel

Production & Marketing

The Israeli Dairy Board (I.D.B.) is an organization, which is jointly owned and managed by representatives of the dairy farmers, dairy processing companies, and the Government of Israel.

The objectives of the I.D.B., as statutorily defined, are:

- To generate and organize cooperation between all the entities active in the sector.
- To implement the government policy regarding planning of milk production and marketing.
- To manage the emergency stock of milk powder in Israel.
- To deal with and dispose of surplus milk.
- To improve the professional standards of the dairy industry, to promote research studies and training programmes, to assist in breeding programmes for dairy cows, sheep and goats, to provide assistance in maintaining animal health standards, to initiate extension services and other activities related to the quality of milk and milk-contents, and in general to improve the overall performance of dairy-farming and the dairy industry.
- To promote the consumption of milk and dairy products.
- To develop international cooperation.

International cooperation

The I.D.B. is involved in and associated with all entities active in dairy production and dairy processing industry in Israel. Therefore, it can provide excellent access to expertise, technologies and other inputs relevant to dairy and to their developments worldwide.

The I.D.B. initiates and encourages commercial relations between the dairy farming and dairy industry sector in Israel and abroad.

In this framework the I.D.B. is involved in the following activities:

- The development of complete and comprehensive dairy-farming packages which include: animal feed, crop production, animal husbandry and milk production, know-how and training programmes, supply of genetic material and other inputs, etc.
- The supply of know-how for processing milk and dairy products.
- The development of commercial relations and the marketing of Israeli dairy products abroad.
- Collaboration in the development of organisations at national and regional levels which manage the dairy industry, including the establishment of a national dairy board, herd-book registers and milk quality control, national dairy-extension services, etc.

*

I.D.B., Senior Economist

Table 2.3

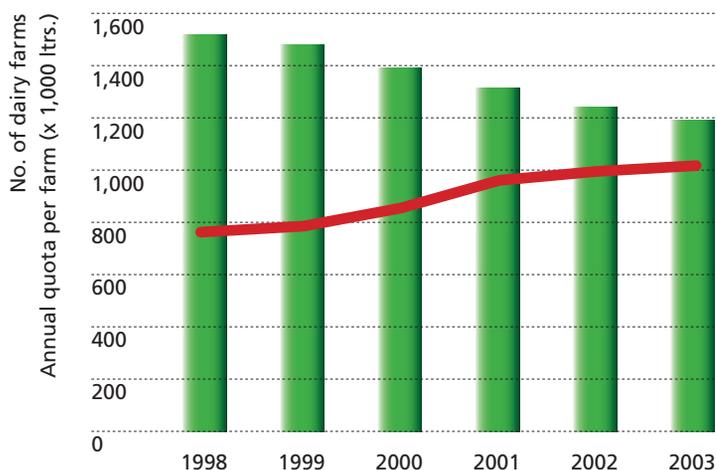
► **No. of dairy farms, by farm type, and average annual milk quota per farm (x 1,000 ltrs.)**

	1998	1999	2000	2001	2002	2003
Family farms (Moshav)						
Number	1,211	1,175	1,091	1,025	962	921
Average quota (x 1,000 ltrs.)	390	402	439	492	511	524
Cooperative farms (Kibbutz)						
Number	218	216	214	209	200	196
Average quota (x 1,000 ltrs.)	2,939	2,966	3,036	3,273	3,335	3,344
Agric. School farms						
Number	16	16	16	16	16	16
Average quota (x 1,000 ltrs.)	703	703	713	750	731	719
Total						
Number of farms	1,445	1,407	1,321	1,250	1,178	1,133
Average quota (x 1,000 ltrs.)	778	799	863	960	993	1,015

Fig. 2.1

► **Number of dairy farms and average annual milk quota per farm, by year**

■ No. of dairy farms
■ Average annual quota per farm



Forms of Settlement

Much of Israel's agriculture is based on cooperative settlements, which were developed in the early 20th century. The Kibbutz is a large collective production unit. Kibbutz members jointly own the means of production and share social, and economic activities. At present, most of the Kibbutz income comes from industrial enterprises owned by the collective unit. Another type of settlement is the Moshav, which is based on individual farms

yet organized as a cooperative society. The residents in both types of settlements are provided with a package of municipal services. The Kibbutz and the Moshav currently account for 83% of the country's agricultural produce.

In addition to the Jewish agricultural sector, Arab villages are located in Israel's rural areas. These villages focus mainly on production of small livestock (sheep and goats), vegetables, field crops and olives.

All the Kibbutz dairy herds

participate in the DHI system and represent 61.7% of the cows with recorded production. Their average milk yield in 2003 was 10,864 kg/cow/year and the average production of protein and fat was 718.5 kg/cow/year. Approximately 75% of the Moshav dairy herds participate in the DHI system and represent 38.3% of the cows with recorded production. Their average milk yield in 2003 was 9,706 kg/cow/year and the average production of protein and fat was 639.2 kg/cow/year.

Milk production in Israel is carried out under a quota system, where the annual volume is divided into monthly quotas. Economic incentives have been set to encourage dairy farmers to level-up production monthly, so that milk supply to the industry is more even during the year.

The “base” price for the milk to the producer stems from an agreement among government, farmers and dairy industries. The price reflects the average cost of production plus an agreed return for the farmers’ labour and invested capital.

Table 2.4 **Cow milk – Annual supply and quota**
 Fig. 2.2 (millions of ltrs.)

Year	Milk supply (millions of ltrs.)	Milk quota (millions of ltrs.)
1994	1,049	1,011
1995	1,112	1,060
1996	1,099	1,075
1997	1,095	1,085
1998	1,126	1,124
1999	1,132	1,124
2000	1,128	1,140
2001	1,174	1,200
2002	1,154	1,170
2003	1,122	1,150

■ Milk supply
 ■ Milk quota

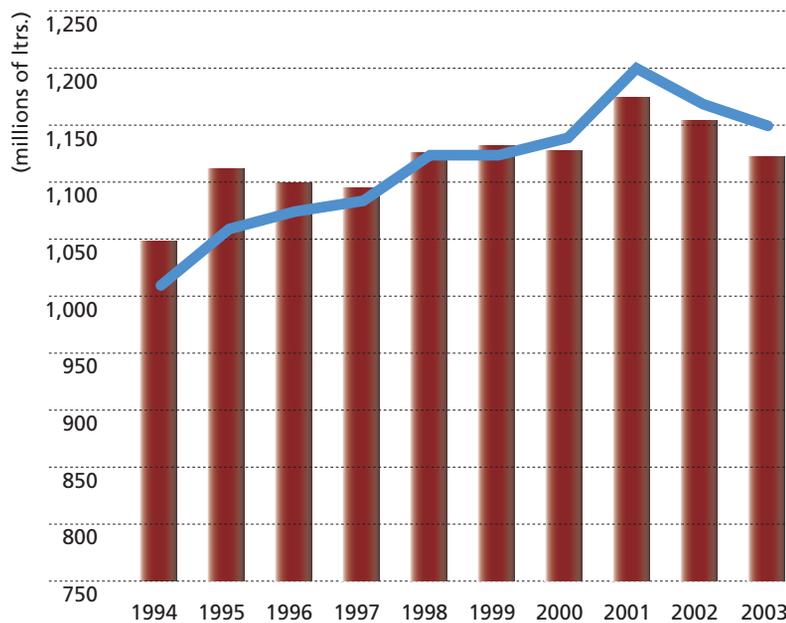


Table 2.5
Fig. 2.3

Milk supply, by somatic cell count categories, in 2003

SOMATIC CELL COUNT		
Quality Grade	Count per ml	% of supplied milk
Premium	Less than 230,000	47.8
Grade A	230,001 – 300,000	32.1
Grade B	300,001 – 400,000	14.8
Grade C	401,000 – 500,000	4.0
Grade D	501,000 – 600,000	1.3
Total		100.0

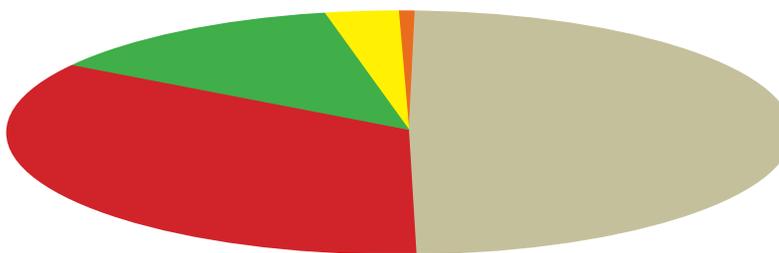
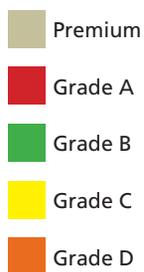


Table 2.6
Fig. 2.4

Milk supply, by bacterial count categories, in 2003

BACTERIAL COUNT		
Quality Grade	Count per ml	% of supplied milk
Premium	Less than 30,000	72.7
Grade A	30,001 – 100,000	25.8
Grade B	100,001 – 150,000	0.8
Grade C	151,000 – 250,000	0.7
Total		100.0

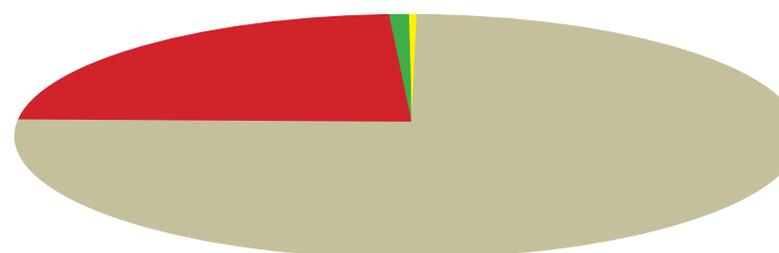
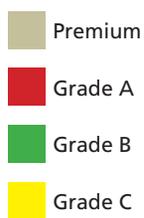
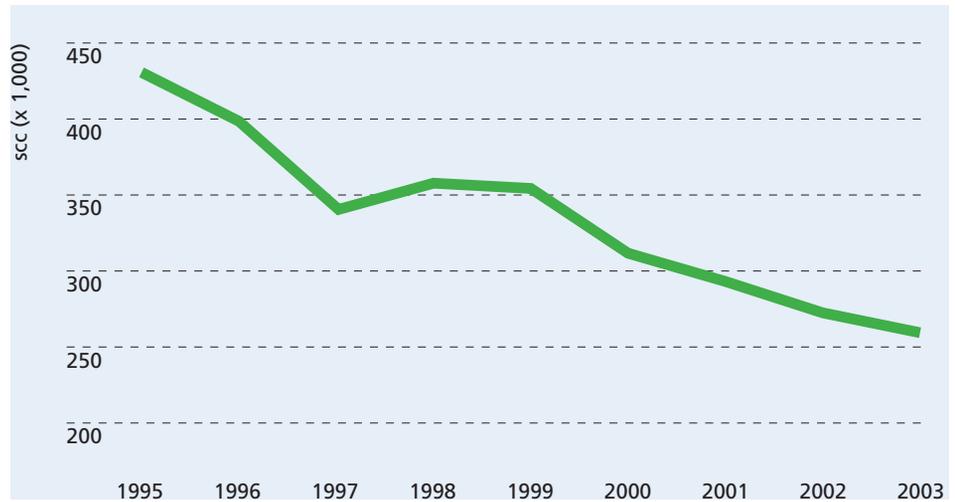


Table 2.7

➤ **Average somatic cell count, by year**



A firm and constant policy was established by the Israeli Dairy Board in the 90s with the aim of improving milk quality. Economic incentives were set in order to lower the somatic cell count in the milk supplied to the industry

and threshold of price categories was progressively lowered along years. The farmers' response caused the average SCC (annual average for all farms) to decrease from 428,000/ml in 1995 to 249,000/ml in 2003.



Table 2.8

➤ **Sheep and goat milk – Annual production**

Year	Sheep milk (x 1000 ltrs.)	Goat milk (x 1000 ltrs.)
1994	7,560	2,019
1995	7,878	2,269
1996	8,735	2,315
1997	9,021	2,581
1998	8,695	2,982
1999	8,716	2,940
2000	8,736	3,375
2001	9,758	3,579
2002	10,389	4,147
2003	9,931	5,142



Sheep and goat production for milk and meat is one of Israel's oldest agricultural branches. Today, approximately 2,500 families raise sheep and goats under a wide range of production systems: from extensive, traditional, semi-nomadic, and transhumant flocks to the intensive, zero-grazing dairy and meat units of Moshav and Kibbutz farms in various parts of the country. The evolution of the Israeli sheep sector is a good example of how modern technology

has been integrated into a traditional farming system through research and extension.

Milk Production

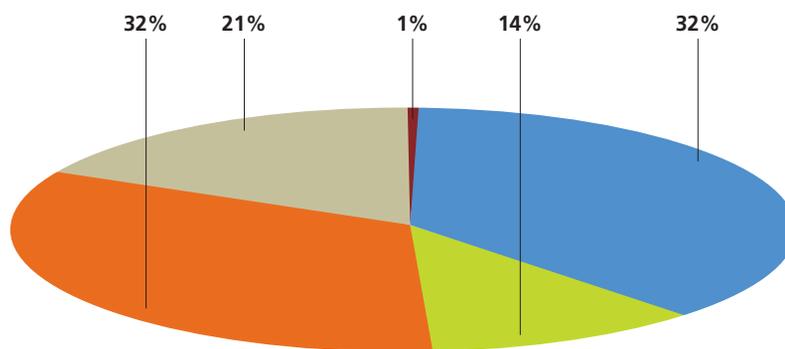
Some 10 million kg of sheep milk and 5 million kg of goat milk are produced annually. The milk is used for a range of cheese and yogurt products. Due to their high quality and hygienic properties, sheep - and goat - cheeses are exported, mainly to the USA.



Table 2.9 **Annual marketed milk, by dairy products – domestic demand – (tons)**

Year	Cow Milk					Sheep & Goat Milk	
	Fluid Milk	Fermented Milk and Desserts	Soft Cheese	Hard Cheese	Butter	Soft Cheese	Hard Cheese
2001	357,277	144,787	78,116	22,042	5,155	971	1,136
2002	359,594	148,743	79,252	22,435	5,423	925	1,140
2003	359,859	147,151	79,900	22,547	5,444	970	1,131

Fig. 2.5 **Distribution of annual marketed milk, by dairy products (% of total, based on skimmed milk equivalent)**



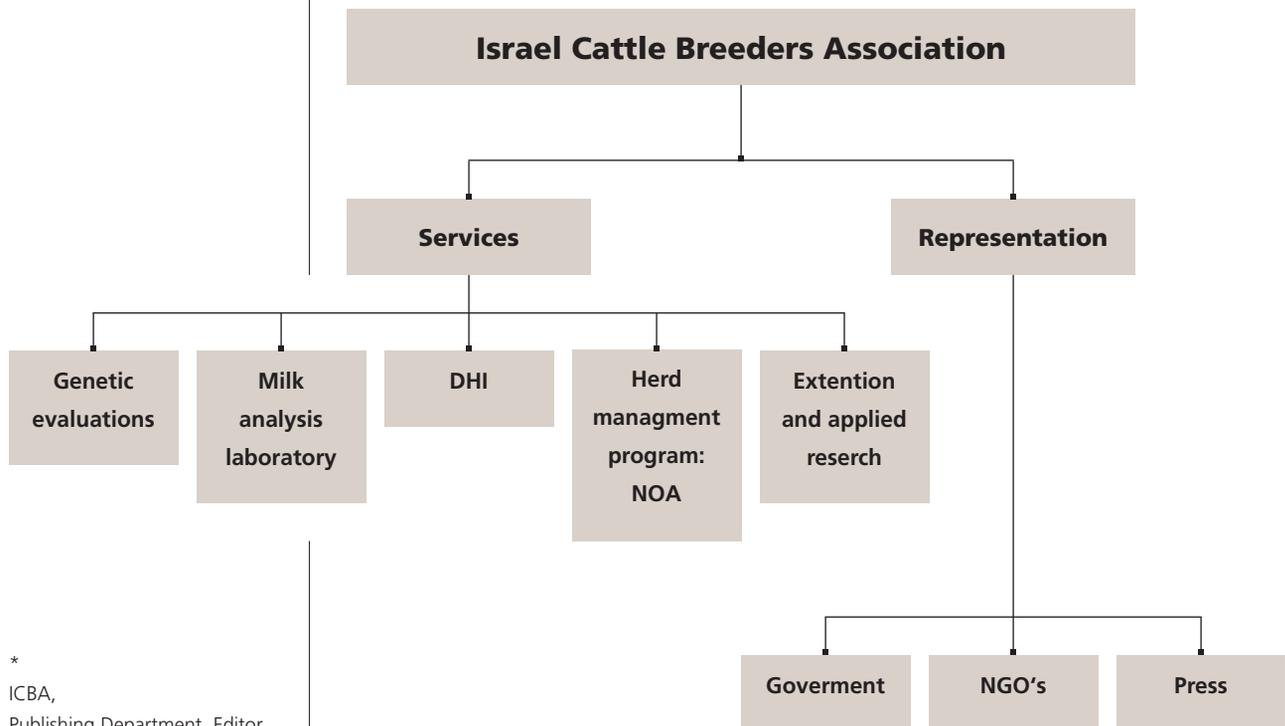
The Israel Cattle Breeders Association — Yossi Malul*



The Israel Cattle Breeders Association represents all dairy cattle farmers in Israel.

For the past 80 years the Organization has been the sole representative of all milk producers in the country, taking care of all their professional needs and sustaining a vibrant and modern industry.

The organization supplies essential assistance to its members and the satellite organizations connected to the industry. The pivot point of the organization is the National Herdbook, which is one of the most comprehensive herdbooks in the world.



* ICBA, Publishing Department, Editor

The ICBA Database _____ Ephraim Ezra *

In 2003 the Israeli Dairy Herdbook collected information from 100,724 cows in 819 herds, 88% of the dairy cows in the country. The ICBA database gathers information and merges additional data from other related sources, and aims to integrate all relevant information regarding the Israeli dairy herd. This integrated database allows farmers, extension advisors, veterinarians, the Sion A.I. company and others, access to controlled and accurate information. Sources and users of this system are listed below:

Input sources

- DHI – Milk recording is performed by two methods. In herds with > 150 cows (70% of the herds), recording is done monthly by an ICBA representative (A4 method), who records the relevant
- Central milk laboratory – This laboratory, presently equipped with three FOSS analyze-instruments, analyzes milk components (fat, protein, lactose, SCC, and MUN) in the DHI milk samples. This laboratory also analyzes milk samples from daily shipments to the dairies. These results are used to determine payment for farmers.
- A.I. technicians - Technicians of the Sion A.I. cooperative services inseminate 98% of the cows in Israel. All cows from the herds included in the DHI system

information on a hand-held terminal. On the remaining 30% of herds, the farmer manually records milk yield (B4 method) and sends the information to the central computer. For all milk-recorded cows, a monthly sample of milk is sent to the Central Milk Laboratory.



*
ICBA, Herdbook Manager



have bar-coded insemination cards containing information on the cows and their pedigree. Before selecting a semen straw, the technician checks bloodlines of the cow and candidate sires, using a hand-held terminal. Inseminations are performed only if inbreeding coefficient is under 3.125%. Details of the inseminations are transferred to the ICBA database, via the terminals.

- National Service for Udder Health and Milk Quality.

The “Udder Health” database is located on the Israel Dairy Board server, and is regularly updated with information on all cows included in the DHI system. Bacterial cultures are matched to other information of the cow; including days in milk, SCC, milk yields, milking status, and calving dates. Results are sent to the farmer and the veterinarian, and merged into the ICBA database.

- Processing plants – Samples of all milk supplied to dairy processing plants in Israel is assayed for fat, protein, lactose, and SCC. For each shipment, the dairies send the farmer a summary including the milk quantity shipped, fat and protein content, and SCC of the milk. This information is transferred to the ICBA database. Once a month the dairies send each farmer and the ICBA a summary of marketed milk volume and payment details.

- Interbull – Every three months a file of genetic evaluations of all recorded bulls in the participating countries is forwarded by Interbull. Information of bulls whose semen has been imported to Israel, but do not have local evaluations, is updated automatically at the central computer, and this information is distributed electronically to the farmers.



- Farms – Approximately 80% of the cows registered on the DHI are located at farms that use a management computer program. About 90% of those farms use the “NOA” program that was developed and is maintained by the ICBA. The farmer enters data on calvings, cows that are “dried off”, new acquisitions, culled cows, veterinary pregnancy check results, diagnostic codes, veterinary treatments, etc. Once a month all information is transferred to the Herdbook database, and a series of logical checks is applied to correct mistakes. Farmers that do not use a computer management program send paper reports that are manually entered into the central database.

Reports

Genetic evaluations of bulls and cows are computed bi-annually in conjunction with the Department of Genetics of the Institute of Animal Sciences of the Agricultural Research



Organization. Results are distributed to the farmers, forwarded to Interbull, and published on the ICBA Hebrew Internet site (www.icba.org.il) that includes an FTP server. Files including data on cow birth, calving and culling dates, milk yields and laboratory results are sent to the “Udder Health” laboratory. Files including data on cow birth, calving and culling dates, results of pregnancy checks and genetic evaluations, including the Interbull evaluations are sent to Sion A.I. company. Milk recording results, records of the milk shipments to the dairies, results of bacterial analyses from the “Udder Health” laboratories, and genetic evaluations, including the Interbull evaluations, are sent to the dairy farms. Monthly summaries are forwarded to the Ministry of Agriculture extension advisors, feed centers, and regional dairy farmers associations. Files including milk recording results, diagnostic codes, and treatments are sent to the “HaChaklait” veterinary cooperative.

Summary

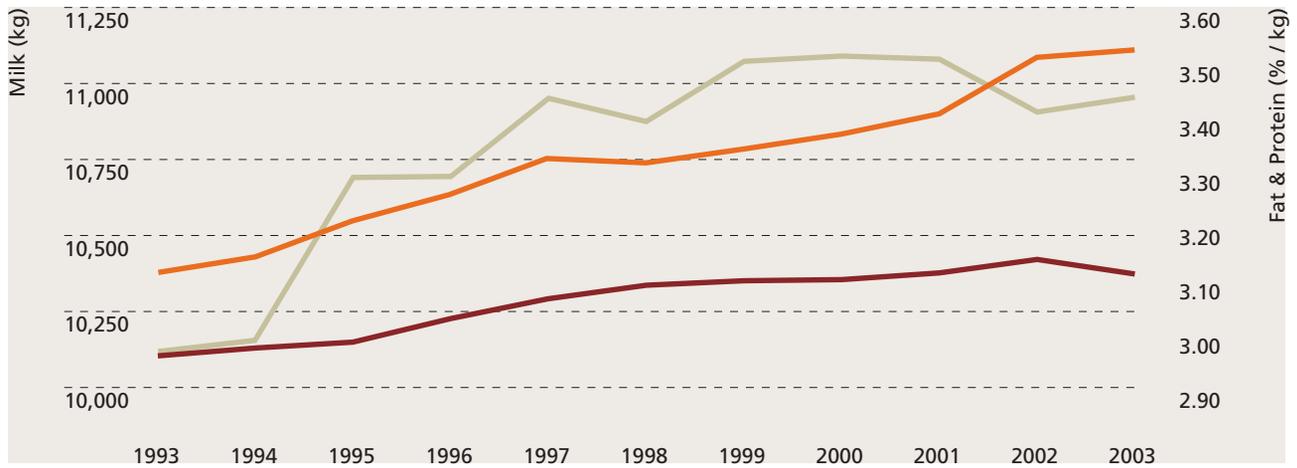
The Israel Cattle Breeders Association database is the hub for all information on dairy farming in Israel. All data are subject to logical checks, so that the dairy farmer and other end-users receive accurate and reliable information. The intensive computer application in Israeli dairy farming enables all of the entities involved to access the large database at a relatively low cost.

Table 3.1
Fig. 3.1

Production averages
of Israeli-Holstein
cows, by calving
year

305-day adjusted
lactations (1-5)

Calving year	No. of cows	Milk (kg)	Fat (%)	Protein (%)
1993	80,311	10,131	3.11	2.97
1994	80,525	10,195	3.15	2.99
1995	83,696	10,665	3.20	2.99
1996	81,477	10,665	3.26	3.02
1997	81,507	10,887	3.33	3.07
1998	82,004	10,850	3.31	3.08
1999	81,742	11,029	3.33	3.08
2000	81,622	11,048	3.37	3.08
2001	80,787	11,031	3.39	3.09
2002	86,554	10,890	3.48	3.11
2003	81,602	10,945	3.49	3.09



- Milk
- Fat (%)
- Protein (%)

In 1991, the milk payment formula was changed in order to promote an increase in milk fat and protein content. Since then, steady progress has been achieved: fat and protein concentration rose 0.54 % and 0.19 %, respectively.

Until the year 2000 there was a constant increment of average annual milk yield per cow and since then a slight decline, mainly due to managerial factors as farmers have been encouraged to have more cows calving in the hot season.



Table 3.2 **Production averages in 2003, by parity number**

	1st lactation cows	2nd lactation cows	Adult cows	Total
Complete lactations				
No.	23,721	17,463	23,000	64,184
Milk yield, kg	10,694	12,045	12,580	11,740
ECM* yield, kg	11,172	12,396	12,666	12,043
Fat yield, kg	381.8	421.2	435.7	411.9
Fat, %	3.57	3.50	3.46	3.51
Protein yield, kg	343.7	382.5	388.5	370.4
Protein, %	3.21	3.17	3.09	3.15

Adjusted 305-d lactations				
No.	22,720	16,927	22,275	61,922
305-d adjusted ECM, kg	11,040	11,232	11,133	11,126
Days in milk	362	352	351	356
Milk yield, kg/day in milk	29.5	34.2	35.8	33
Calving interval	429	420	420	423
ECM yield, kg/cow in herd-day	26.1	29.5	30.1	28.5
Dry period, days	65	67	68	67
Days open	153	143	144	147

Calvings				
Total No. of calvings	33,489	24,471	41,003	98,963
Calves born	33,864	25,480	43,863	103,207
Age at calving, months	25	39	66	45
Normal calvings	29,781	23,048	38,740	91,569
Normal calvings, %	88.9	94.2	94.5	92.5
Premature calvings	772	602	933	2,307
Premature calvings, %	2.3	2.5	2.3	2.3
Abortions, %	8.5	8.7	7.9	8.3
Stillborn calves, %	9.2	6.9	7.8	8.1

* ECM = Economic Corrected Milk, according to the formula for milk payment: 9.436 * kg Fat + 22.018 * kg Protein



Table 3.3

► **20 cooperative herds with highest average annual milk yield per cow (3x milkings) in 2003**

	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
1	Alumim	12,912	12,651	3.61	3.09	847	166	258
2	Nirim	12,849	12,524	3.41	3.20	827	189	237
3	Habonim	12,849	12,166	3.73	3.20	843	239	226
4	Nachal Oz	12,638	12,480	3.43	3.14	818	146	255
5	Tze'elim	12,566	12,125	3.62	3.16	821	247	244
6	Ma'ale HaKhamisha	12,563	12,159	3.57	3.17	818	210	243
7	Yavne	12,537	12,027	3.62	3.19	818	156	371
8	Nir Yitzhak	12,484	12,258	3.49	3.14	811	201	254
9	Carmiya	12,427	11,972	3.58	3.18	809	221	288
10	Ein Carmel	12,352	11,942	3.70	3.12	813	396	250
11	Ma'ale Gilboa	12,327	12,329	3.32	3.13	793	234	225
12	Ramat HaKovesh	12,320	11,984	3.62	3.12	807	255	259
13	Kefar Giladi	12,283	12,492	3.44	2.99	803	147	263
14	Kisufim	12,267	11,643	3.59	3.25	796	126	222
15	Sa'ad	12,182	11,695	3.56	3.21	791	213	275
16	Ein Tzurim	12,179	11,927	3.40	3.19	784	252	284
17	Ein HaShlosa	12,176	11,374	3.63	3.31	789	265	257
18	Beit Kama	12,144	12,024	3.43	3.12	787	230	204
19	Givat Haim I	12,106	11,498	3.73	3.18	795	204	323
20	HaMa'apil	12,075	11,791	3.57	3.13	789	199	307



Table 3.4 **20 Family herds with highest average annual milk yield per cow (2x + 3x milkings) in 2003**



Village	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
Havat Shekhafim	Havat Shekhafim	12,761	12,498	3.53	3.13	831	173	60
Be'er Tuvia	Botzlin Farm	12,390	12,283	3.4	3.13	801	142	43
Be'erotaim	Weiss Farm	12,342	11,848	3.48	3.24	796	209	75
Givat Yoav	Tzafrir Farm	12,339	11,912	3.59	3.17	805	158	46
Kefar Yehezkel	Vered Farm	12,295	12,300	3.43	3.08	799	156	61
Givat Yoav	Golani Farm	12,286	12,120	3.53	3.10	802	228	47
Be'er Tuvia	Amir Farm	12,128	11,902	3.43	3.16	784	246	84
Sde Ya'akov	Baranawski Farm	12,106	11,938	3.48	3.12	787	93	96
Kefar Ha'roeh	Peleg Farm	11,858	11,600	3.44	3.18	766	165	86
Givat Yoav	Ben Yosef Farm	11,858	11,198	3.75	3.21	778	189	37
Be'er Tuvia	Tzur Farm	11,849	11,609	3.49	3.15	769	240	122
Givat Yoav	Gat Farm	11,826	11,330	3.57	3.22	768	124	38
Beit She'arim	Marmur Farm	11,792	11,539	3.51	3.14	767	121	53
Eli'ad	Tzevrecki Farm	11,748	11,074	3.66	3.25	765	316	26
Be'er Tuvia	Chanin Farm	11,745	11,288	3.55	3.21	762	245	48
Givat Yoav	Eliezer Farm	11,745	11,041	3.75	3.23	770	142	46
Givat Yoav	Sofer Farm	11,735	11,353	3.58	3.16	765	148	37
Amatz	Sahar Farm	11,723	11,213	3.57	3.22	761	314	71
Beit Hilel	Steinfeld Farm	11,713	11,052	3.68	3.24	764	254	46
Givat Yoav	Aharonov Farm	11,619	11,437	3.59	3.08	762	239	46

Table 3.5

► **20 cows with highest adjusted ECM yield in 2003**

Herd	Cow No.	Sire	Lact. No.	ECM kg	Milk kg	Fat %	Protein %
Sofer Farm	703	Teva	4	19,674	16,767	4.83	3.26
Alumim	1845	Scorer	3	17,902	17,049	3.85	3.12
Carmiya	5340	Snapir	3	17,796	15,243	4.56	3.35
Alumim	1945	Scorer	3	17,756	16,780	3.61	3.26
Ma'agan beYonatan	1797	Tevach	3	17,127	18,747	3.04	2.84
Nirim	3970	Extreme	2	17,058	16,155	3.22	3.42
HaBonim	5404	Kapatz	1	17,030	16,378	3.33	3.29
Be'eri	5572	Supreme	5	16,923	16,995	3.73	2.93
Alumim	1927	Siam	3	16,837	15,642	3.79	3.27
Alumim	2008	Boiler	2	16,693	15,660	4.16	3.06

Be'eri	5749	Scorer	4	16,624	15,493	3.80	3.25
Nirim	3482	Sport	5	16,610	16,375	3.67	3.03
Givat Haim I	1631	Royal	2	16,607	15,277	4.04	3.20
Nirim	3937	Magof	2	16,572	16,418	3.68	3.01
Ramat HaKovesh	4844	La'am	6	16,465	15,313	4.04	3.15
Nirim	3969	Boiler	2	16,390	14,914	3.83	3.35
Ramat HaKovesh	5206	Flor	4	16,314	15,735	3.91	3.03
HaMa'apil	4241	Kipod	6	16,282	15,169	3.56	3.35
Ramat HaKovesh	5168	Scorer	4	16,270	16,589	3.33	3.03
Eylon	8131	Shenef	2	16,211	15,280	4.08	3.07



Herd	Cow No.	Sire	Lact. No.	Days in milk	Milk kg	Average milk yield kg/day	Fat %	Protein %	Culling date
Givat Oz	654	Amir	15	5,727	176,123	30.7	3.13	2.87	09.03
Tze'elim	2798	Duran	12	4,578	167,108	36.5	3.48	2.86	
Ma'ale Gilboa	6492	Lasso	10	3,360	152,366	41.6	3.22	2.89	
Yair Israeli	607		11	4,365	146,814	33.6	3.22	3.02	
Tze'elim	3523	Pitzpon	7	3,186	145,038	45.5	2.96	2.89	
Ramat HaShofet	2900	Geshem	11	3,428	139,867	40.8	3.03	2.89	
Palmachim	2970	Sharash	10	3,650	139,701	38.2	3.15	3.23	
Hof HaSharon	15975	Boteach	11	3,469	138,544	39.9	3.46	2.89	
Mishmar HaNegev	3415	Shosh	11	3,429	138,509	40.3	3.33	3.08	
Kfar Blum	2703	Shatz	12	4,052	137,191	33.8	3.47	3.22	01.03
Givat HaShlosa	836	Dom	10	3,932	137,190	34.8	3.32	2.90	
HaMa'apil	3420	Gag	10	3,555	136,938	38.5	3.14	3.00	09.03
Reshafim	3128	Boteach	10	3,551	136,694	38.4	3.44	2.99	
Ein Tzurim	3883	Adir	10	3,241	136,570	42.1	3.26	3.18	11.03
Givat HaShelosa	3275	Boteach	8	2,917	136,493	46.7	3.37	2.76	02.03
Nachal Oz	3010	Poshet	12	3,737	135,210	36.1	3.86	2.98	
Kiriat Anavim	969	Diuk	10	3,455	133,853	38.7	3.26	2.84	10.03
Givat Haim I	369	Pony	9	3,485	133,450	38.2	2.90	2.86	
HaKhotrim	4909	Lime	10	3,274	132,645	40.5	3.22	2.90	10.03
Ein HaKhoresh	9532	Boteach	10	3,357	132,542	39.4	3.00	3.04	

▲
 Table 3.6 **20 cows with highest lifetime yield, producing in 2003**



NOA – The Israeli Dairy Herd Management Program

____Boaz Hanochi *

NOA is a comprehensive program for dairy herd management which was developed by the Israeli Cattle Breeders Association (ICBA). **NOA** addresses all aspects of dairy farming. **NOA** has been designed to give the herd manager updated information regarding all aspects of dairy activity.

Major features of NOA

- Herd management – Updating of lactation, production and reproduction events. Cows' entry, culling and moving between groups within the herd. Veterinary data: input of diagnosis, treatments, medications, etc.
- Feeding – Linear programming and ration composition, feed production and TMR planning, stock management

and stock reports. Communication with feeding controllers. Complete tracking and monitoring of feed consumption.

- Milk production – Milk marketing updating, milk recording and summary reports including lactation summaries. All the Herdbook parameters are available in **NOA**. Communication with different brands and types of commercial milk-meters (on-line milk data).
- Genetic management – Graphical presentation of cows' and bulls' data. Mating program. Simple tools to implement breeding program according to particular herd goals.
- Additional features – Shared database (network), powerful report generator, PDA application for pocket pc (IPAQ-HP) that includes all cows' data. More than 40 pre-programmed reports.



*

ICBA, Product Manager of
NOA Software



Annual Data: 3076

Udder Health | Stay in Groups | Insemination paused | Type Classifying | Measurements | Treatments and Vaccinations | Vet. Invitations

Implantations | Dryings | Calving/Abortion | Heats | Inseminations | General

Fertility and Veterinary | Production data | Daily milk | Milk Recordings | Calving details | Matings | Flushing

General Data
 Lact: DIM: Fertility Status: Days:
 Life Yield: Exp. Dry: Exp. Calving:

Last milk recording data
 Date: Milk/kg: Fat %: Soc:
 Milk rec. type: ECM: Prot. %:

Present Lact. data
 Milk/kg: Fat %: Prot. %: Accum. ECM:
 Ave. ECM to DIM: Est. EDM: Cost. EDM: Diff. from Herd:

Last Weight
 Date: Wt: Height: Daily feed cost:

Genetically data

	Milk	Fat %	Prot. %	Soc	Dau. Fertility	breeding Val.	Calc. Type:
Prod. poten.	140	0.20	0.05	-0.90	11.05	1100	Progeny Test
PTA	-48	0.10	0.01	-0.34	6.00	210	Defects:

NOA coordinates import and export of files to the national Herdbook database, dairy processing plants, central milk laboratory, livestock insurance companies, "Udder Health" laboratory, feed mills, and others.

NOA uses a Windows user interface and is user-friendly, despite its complexity and sophistication. The program was developed by top Israeli dairy herd professionals in order to meet the needs of both small and large dairy enterprises.

NOA was introduced in Israel in April, 2000. Today, more than 450 dairy farms use the program, including 95% percent of all dairy farms with over 250 dairy cows. Each month new dairy farms install the program.

NOA interfaces with all aspects of dairy production control, including milking robots and feeding controllers. For the first time, comprehensive dairy farm management is possible with a single integrative and user-friendly program. The program is maintained

by an ICBA professional team that includes experienced field advisers, phone support for software users and programmers. Communication between the dairy farm computer and the national Herdbook database is carried out via an Internet website maintained by ICBA. Numerous dairy farmers and entities in the dairy industry are connected via the "Dairy Web", which facilitates two-way interactive exchanges and provides E-mail, a bulletin board and other services.



The Israeli Selection Index _____ Ephraim Ezra* / Joel I. Weller**



The Israeli breeding program is monitored by the Israeli breeding and herdbook committee, which includes representatives of the Sion A.I. company, the Israeli Cattle Breeders Association, and scientists of the Department of Genetics of the Institute of Animal Sciences of the Agricultural Research Organization.

PD01 – THE ISRAELI SELECTION INDEX

Index coefficients for milk, fat, and protein were computed to maximize expected farmer profit. Profit was computed as income less cost of feed required to produce the three milk components, transportation costs for fluid milk, and the fixed costs per cow, which were set so that the net profit would equal zero. The Index coefficients were computed by differentiating the profit equation with respect to each component. The index coefficients were normalized so that one standard kg of milk with 3.34% Fat and 3.08% protein would have a unit value. The index coefficient for SCS was computed so that expected changes for would be close to zero. The index coefficient for female fertility was computed to account for the economic value of this trait relative to milk production. The current index, PD01, last updated in 2001 is as follows:

$$\text{PD01} = - 0.22 \text{ (kg milk)} + 8.5 \text{ (kg fat)} + 31 \text{ (kg protein)} - 300 \text{ (SCS)} + 26 \text{ (female fertility)}.$$

Expected genetic gains after ten years of selection using this index are: 575 kg milk, 29 kg fat, 24 kg protein, 0.1% fat and 0.09% protein, -0.08 SCS and 2.2% for female fertility. Even though the ratio of fat to protein in the index is 1:3.6, expected gain for fat is still greater than for protein.

Genetic evaluations for milk, fat, and protein production, SCS, and fertility are calculated by the multitrait animal model, using parities 1 to 5, with each parity considered a separate trait. The base for all genetic evaluations is the mean breeding value for cows born in 1995.



*
ICBA, Herdbook Manager

**
A.R.O. – Institute of Animal
Sciences – Dept. of Genetics,
Genetist

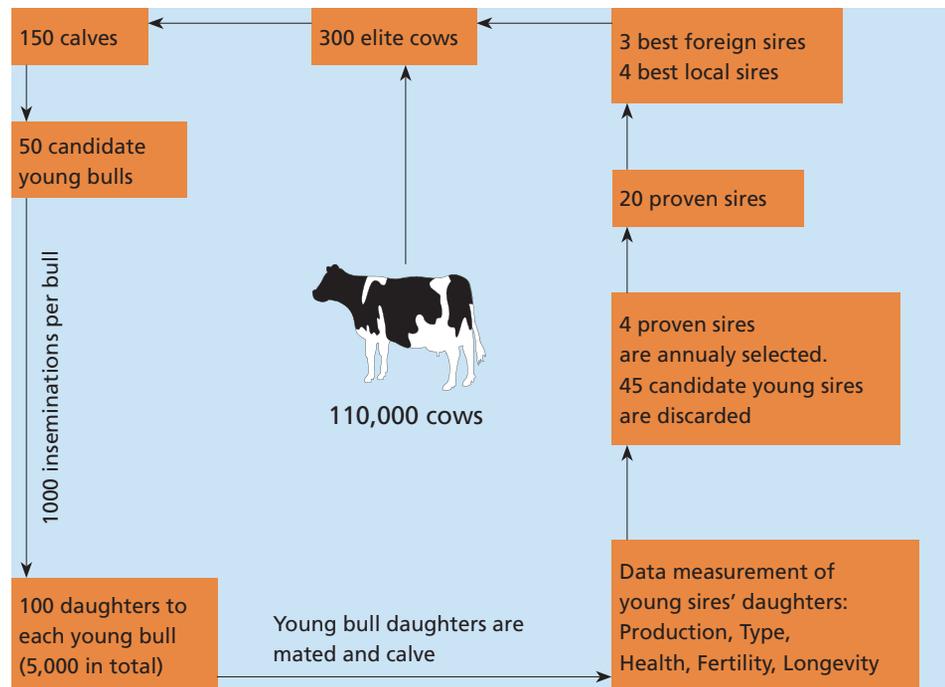
The Israeli Breeding Program — Yoel Zeron*

The Sion A.I. Company was founded in 2001 by the merging of the On and Hasherut A.I. cooperatives. Sion currently keeps 240 bulls located in four different sites. Approximately 50 young bulls are tested every year. Semen from approximately 20 bulls is available to the Israeli dairy farmers for general service. Most are proven bulls with evaluations based on daughter production records, and the rest are high pedigree index young bulls. Genetic evaluations are calculated bi-annually. Bulls and cows are ranked by the Israeli selection index PD01.

Each year, approximately 350,000 inseminations are performed in

Israel, 92.5% with local semen of the Israeli-Holstein breed. Sion employs 36 insemination technicians. The 1,100 dairy farms are divided into 30 insemination districts, and the remaining six technicians work as substitutes. Currently, 88% of dairy herds are included in the DHI system. Insemination Information is recorded by the technicians on hand-held computer terminals. This system allows for error-free transfer of data to the central ICBA computer, and prevents mating of closely related animals. The technician first enters the details of the proposed mating. The proposal is rejected if inbreeding coefficient of the proposed

► **Diagram of the Israeli Breeding Program**



* Sion A.I. company, Director of Science and Production



mating is greater than 3.125%.

The bulls are housed at four different sites. Young bulls are located in two locations in the north of Israel, and active bulls are kept at the central AI center south of Tel Aviv. Insemination of elite dams is programmed by the "Meytal" mating program, which tracks expected matings and calving dates. The elite dams, which are owned by the dairy farmers and kept at the farms, are inseminated by "Sion" with some of the highest ranked bulls in the world based on Interbull evaluations and with the best local bulls. Male calves born from those inseminations are bought by "Sion" at the age of one week. Semen collection starts when bulls are 14 months old. When the bulls are 16 months old, their semen is used to inseminate approximately 1,000 first-parity cows in DHI herds. This process is generally completed within three months. Semen from the young bulls is collected bi-weekly during a period of two years, and stored in the semen bank. This system assures a large semen bank for each bull that can be used immediately after the bull is approved for general use at the age of five years, even if the bull is unable to produce semen at a later age. Genetic evaluations are computed bi-annually, and the status of the bulls and cows



are reevaluated after each new genetic evaluation.

The Israeli breeding program encourages the extensive use of young bulls with outstanding genetic value based on pedigree. These bulls are used for general service and perform 3-5 times more inseminations than the regular young bulls. Extensive use of these bulls increases the mean breeding value of the national population. In addition, the evaluations of these bulls at the age of five years will have higher reliability due to the greater number of daughter records.

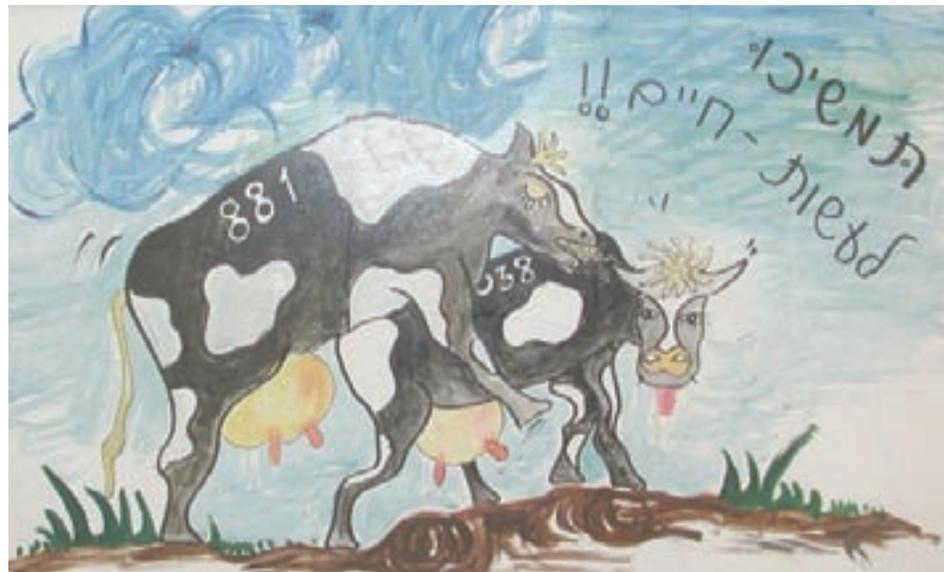
The Israeli dairy cattle population has the highest mean milk and milk solid production in the world, even though dairy production conditions are suboptimal due to heat stress in most areas during most of the year. Israeli bulls transmit outstanding genetic ability for milk yield and components and excel in fertility and udder health traits. This impressive achievement is the outcome of the long-term cooperation among farmers, Sion A.I. company, the Israeli Cattle Breeders Association, the Agricultural Research Organization, and the Ministry of Agriculture – Extension service (Sha'ham).

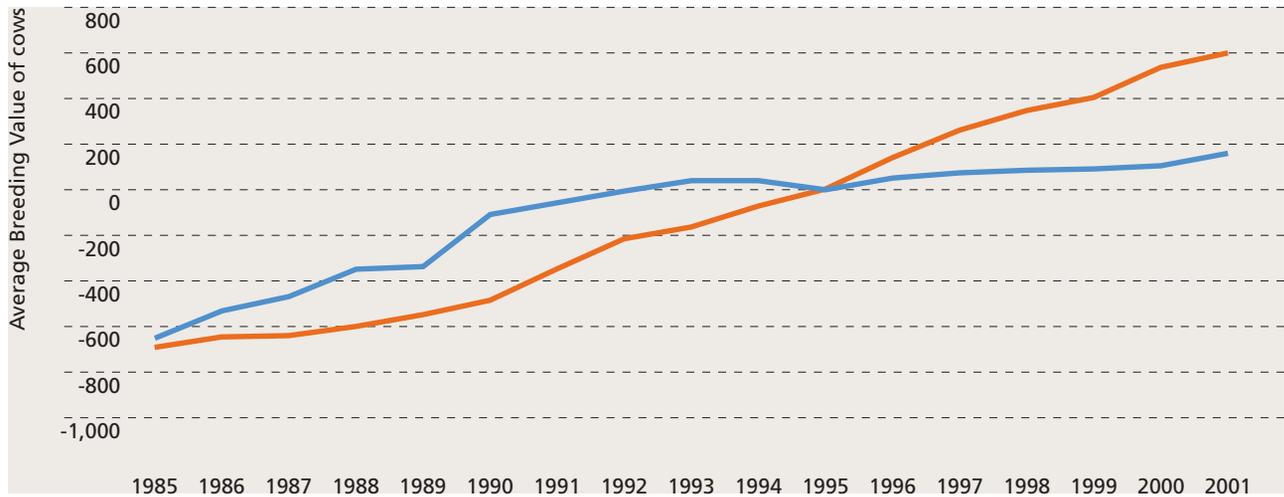


Table 3.7

Average Breeding Value of cows, by birth year – Genetic Trends

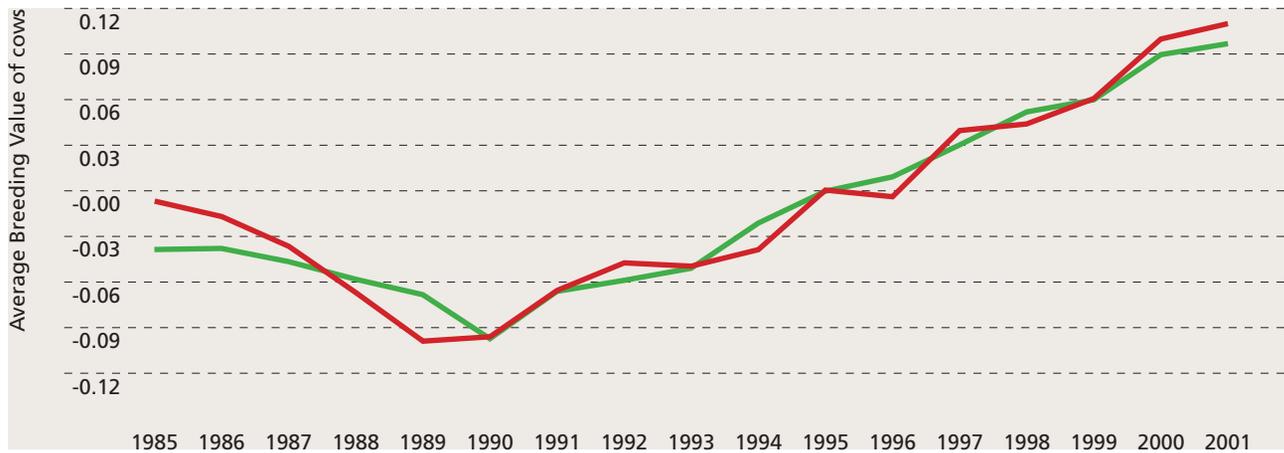
Birth year	Milk kg	Fat kg	Fat %	Protein kg	Protein %	Daughters' Fertility	PD01 kg
1985	-709	-23.6	-0.01	-24.8	-0.04	0.93	-700
1986	-571	-20.7	-0.02	-21.5	-0.04	0.24	-652
1987	-508	-20.6	-0.04	-20.0	-0.05	-0.30	-646
1988	-375	-20.0	-0.07	-17.8	-0.06	-0.23	-620
1989	-356	-18.4	-0.10	-15.4	-0.07	-0.22	-570
1990	-122	-15.2	-0.10	-14.0	-0.10	-0.24	-523
1991	-65	-10.1	-0.07	-10.1	-0.07	0.00	-374
1992	12	-5.3	-0.05	-6.0	-0.06	0.47	-218
1993	40	-4.3	-0.05	-4.0	-0.05	0.19	-184
1994	37	-2.8	-0.04	-1.2	-0.02	-0.30	-90
1995	0	0.0	0.00	2.9	0.00	0.00	0
1996	62	2.2	0.00	3.0	0.01	0.16	120
1997	77	6.0	0.04	5.2	0.03	0.67	247
1998	77	6.3	0.04	7.2	0.05	1.36	334
1999	93	8.8	0.06	9.1	0.06	0.98	414
2000	100	13.3	0.10	12.2	0.09	0.24	524
2001	172	17.1	0.11	15.3	0.10	-0.24	596





▲
 Fig. 3.2 **Average Breeding Value of cows for PD01 and Milk, by birth year – Genetic Trends**

■ Milk
 ■ PD01



▲
 Fig. 3.3 **Average Breeding Value of cows for Fat and Protein percentages, by birth year – Genetic Trends**

■ Fat %
 ■ Protein %



Birth year	Number of bulls	Milk kg	Fat kg	Fat %	Protein kg	Protein %	SCS	Daughters' Fertility	PD01
1981	32	-335	-14.5	-0.04	-12.4	-0.02	-0.06	0.25	-410
1982	60	-351	-11.4	0.00	-11.9	-0.01	-0.04	0.14	-375
1983	19	-158	-8.4	-0.03	-9.4	-0.04	-0.07	0.45	-296
1984	38	-314	-11.0	-0.01	-12.2	-0.03	-0.05	0.04	-388
1985	39	-304	-7.8	0.02	-11.2	-0.02	-0.02	0.08	-337
1986	31	-220	-7.3	-0.00	-9.0	-0.02	0.06	-0.13	-315
1987	38	-175	-7.8	-0.02	-5.5	-0.00	0.07	-0.05	-218
1988	49	-102	-3.8	-0.01	-4.9	-0.02	-0.05	-0.46	-158
1989	33	-37	-1.3	0.00	-4.1	-0.03	-0.05	0.01	-112
1990	31	-84	-2.5	0.00	-4.6	-0.02	-0.04	0.66	-117
1991	41	52	-0.2	-0.02	1.5	0.00	0.05	-0.05	16
1992	42	-116	0.8	0.04	0.2	0.04	0.04	-0.49	13
1993	53	-146	-1.4	0.03	-1.1	0.03	0.03	0.16	-19
1994	47	-51	1.3	0.03	2.2	0.04	-0.01	-1.03	67
1995	38	28	10.1	0.09	6.2	0.05	-0.01	-0.58	261
1996	53	-105	5.8	0.09	3.5	0.06	0.03	-0.86	151
1997	31	-73	8.6	0.10	6.6	0.08	-0.11	0.48	341
1998	58	73	13.1	0.10	11.2	0.09	-0.01	-0.94	421

Table 3.8 **▲ Average Breeding Value of bulls, by birth year**

Table 3.9

➤ **Bulls that performed largest number of inseminations (all years)**

Bull No.	Bull name	Sire	No. of inseminations
829	Gyus	Oren	198,997
3274	Scorer	Thonyma Secret	195,125
2132	Gaby	Arlinda Jet Stream	181,527
783	Pirchach	Hason	160,375
3212	Sinbad	Sunran Sundacer	145,711
3651	Avsha	Sea-Mist Bell Extra	131,359
2124	Shoeg	Shofet	128,094
787	Amir	Icar	119,631
3258	Shenef	Pony	115,973
2357	Flor	E-Z-Acres Starlite Bachelor	114,112
3241	Teva	Kingstead Valint Tab	111,922
3089	Pitspon	Gyus	111,183
3123	Tamim	Crescentmead Chief Stewart	110,645
3080	Pirate	Sabal	110,058
2122	Shats	Shofet	110,046
3304	Goopi	Goliat	108,768
2176	Genosar	Gyus	103,848



AVSHA 3651

Genetic Evaluation:
February '04
Genetic Base line:
Cows born 1995



Born: 26/9/95 Sire: Sea-mist Bell Extra TL
Owner: SION A.I. Dam: Dekel
 Dam Sire: Boteach

Records: 2180 Daus: 1888
DIM: 198 Herds: 521

Production Traits

Rel.	Milk kg	ECM	Fat kg	Fat %	Prot. kg	Prot. %	SCS
99%	544	660	27.9	0.09	18.3	0.02	0.06

Functional Traits

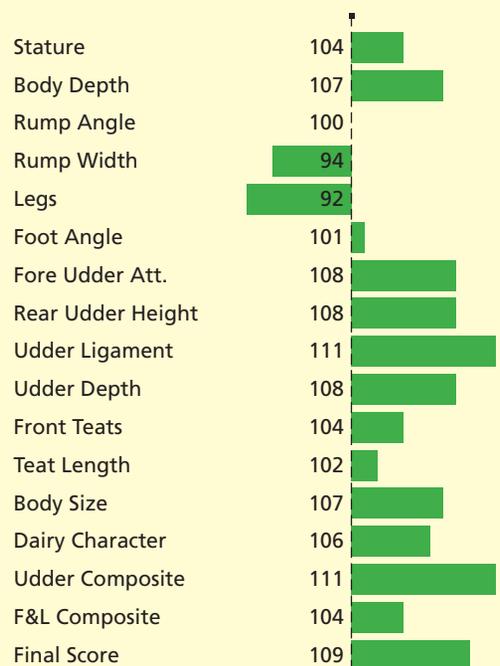
Calv. Diff.	Rel.	Daus. Fertility	Rel.	Longevity (days)	Rel.
1.3	98%	-0.2	96%	204	97%

Average Daughter performance (305d)

Milk kg	Fat %/kg	Protein %/kg	ECM
11,438	3.46	3.02	11,519

Type traits

Rel. 98% Daus: 231



100

Fertility Statistics

Information on insemination and pregnancy checks enable a thorough analysis of fertility performance at national and herd level. Reports are issued to farmers and are the basis for

practical decisions regarding fertility management. Data is presented as average results by parity categories.

Table 3.10
Fig. 3.4

Average Conception Rate at 1st service, for Heifers, 1st Lact. cows and Adult cows (all herds), by years

Conception Rate at 1st service (%)			
Year	Heifers	1st Lact. cows	Adult cows
1993	61.2	43.3	34.8
1994	65.6	42.6	34.7
1995	65.1	44.7	36.8
1996	64.6	44.2	36.9
1997	62.7	43.9	35.7
1998	59.6	40.4	33.2
1999	63.3	43.1	36.7
2000	63.2	44.5	37.4
2001	63.9	44.0	37.1
2002	63.8	43.0	36.1
2003	64.6	43.0	36.4

- Heifers
- 1st Lact. cows
- Adult Cows

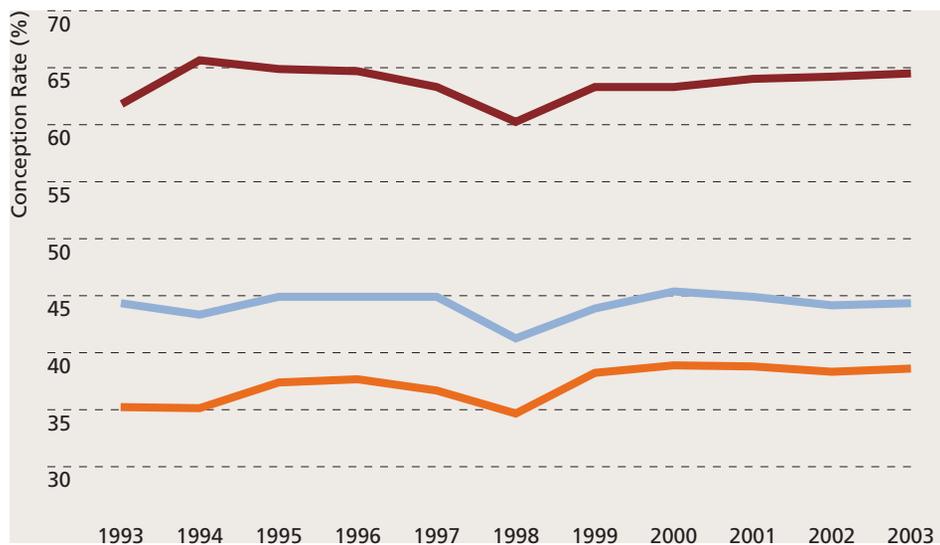


Table 3.11

► **Fertility summary
for first-calvers
all herds
31/10/02 – 01/11/03**

Number of first-calvers and Conception Rate, by days post-partum at 1st service			
	N	% of total	C.R.(%)
< 70 days	1,750	6.6	39.1
71 - 100 days	12,361	46.5	44.5
101 - 130 days	10,099	38.0	44.1
131 - 150 days	2,360	8.9	40.3
Average age at 1st service (d)	100		
Number of first-calvers and Conception Rate, by insemination number			
	N	% of total	C.R.(%)
First inseminations	28,437		43.0
Second inseminations	16,076		36.9
Third inseminations	9,810		33.5
Fourth + more inseminations	16,723		28.4
Total of inseminations	71,046		36.9
Inseminations without follow-up	70	0.1	
Double inseminations	3,140	4.0	
Inseminations/Pregnancy	2.8		
Wasted days	47		
Heat detection			
Distribution of cycles' length (days):			
5 - 17	1,421	4.0	
18 - 15	20,323	63.0	
16 - 35	3,237	10.0	
36 - 60	7,220	22.0	
Total of natural cycles	32,201		
Induced cycles	2,822	8.0	
Average days between inseminations	27		
Rejections by inseminator	10,948	13.3	
Preg.checks with negative results	6,575	20.5	
Distribution of first-calvers, by age at effective insemination			
< 75 days	1,151	4.9	
76 - 110 days	8,137	34.4	
111 - 150 days	7,070	29.9	
Average Open days	135		

Table 3.12

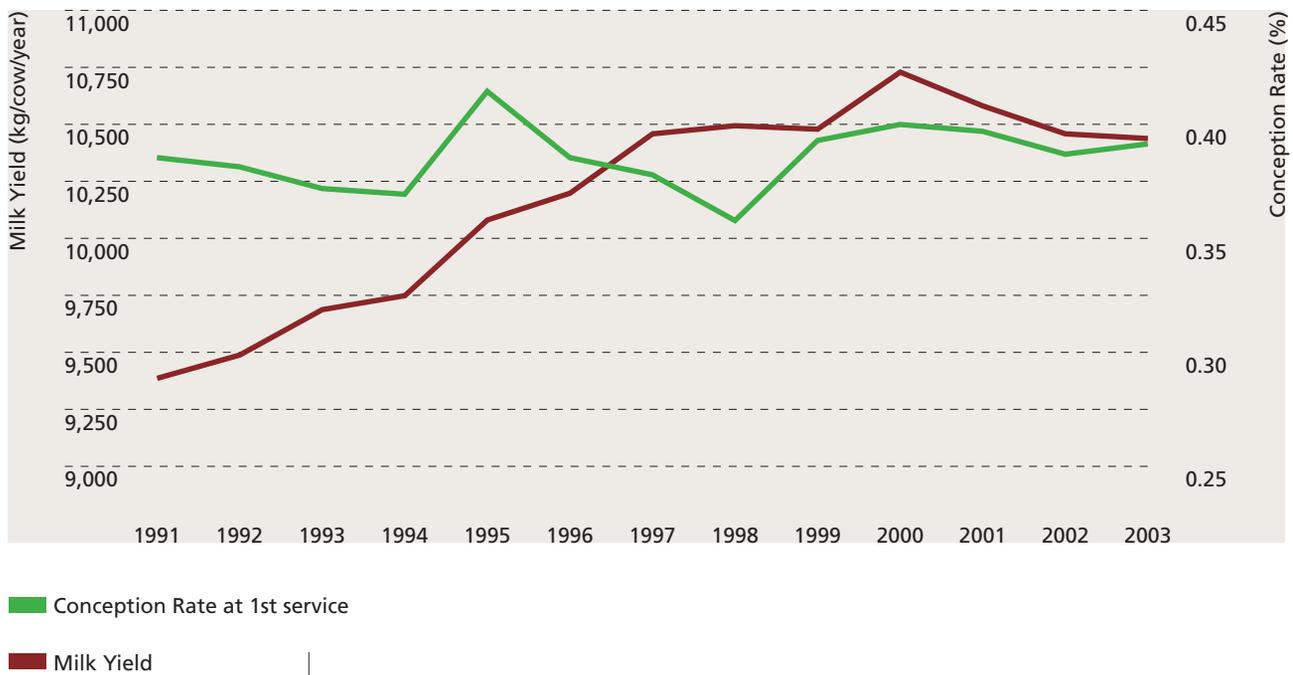
**Fertility summary
for adult cows
all herds
31/10/02 – 01/11/03**

Number of adult cows and Conception Rate, by days post-partum at 1st service			
	N	% of total	C.R.(%)
< 50 days	324	0.6	21.3
51 - 80 days	14,341	28.5	34.6
81 - 110 days	24,504	48.7	38.2
111 - 150 days	11,107	22.1	36.5
Average age at 1st service (d)	94		
Number of adult cows and Conception Rate, by insemination number			
	N	% of total	C.R.(%)
First inseminations	52,983		36.4
Second inseminations	32,726		34.7
Third inseminations	20,174		30.7
Fourth + more inseminations	32,054		26.1
Total of inseminations	137,937		32.8
Inseminations without follow-up	300	0.2	
Double inseminations	6,725	4.5	
Inseminations/Pregnancy			
Wasted days	57		
Heat detection			
Distribution of cycles' length (days):			
5 - 17	4,140	6.5	
18 - 15	37,350	58.5	
16 - 35	8,075	12.7	
36 - 60			
Total of natural cycles	63,797		
Induced cycles	6,585	9.4	
Average days between inseminations	28		
Rejections by inseminator	16,768	10.8	
Preg.checks with negative results	15,434	25.8	
Distribution of adult cows, by age at effective insemination			
< 75 days	3,485	8.3	
76 - 110 days	14,127	33.8	
111 - 150 days	11,711	28.0	
Average Open days	131		

The main fertility management goal is that cows and heifers should conceive at the desired time, so that calvings will occur according to the projected production schedule. Many studies in recent years have indicated a negative association between of milk production and female fertility.

Fig. 3.5 shows that between 1991 and 2003 mean milk production increased by 1,000 kgs, without reduction in fertility, as evaluated by pregnancy rate of adults cows at first service. This value has remained near 38% during the entire period. The lowest value (35.9 %, in 1998) was the result of a very hot summer season, which significantly reduced pregnancy rate.

▼
Fig. 3.5 **Average Milk Yield and Conception Rate at 1st service, for adult cows, between 1991 – 2003**



Hahaklait Veterinary Services



Our Beginning

Hahaklait was established back in 1919 by a handful of enthusiastic pioneer farmers. The vision they had was to combine a mutual insurance policy with comprehensive veterinary medicine. The initial motive was to protect valuable cattle, which were imported into a hot land, burdened with disease. Hahaklait was founded as a cooperative, which was owned and managed by the farmers for the benefit of the farmers. The veterinarians were contracted as the employees of the cooperative. From its small beginning as a few farms around the Sea of Galilee, Hahaklait grew hand in hand with the Israeli Food Animal Industry to encompass the entire country.

Our Mission

Today, 85 years later, Hahaklait is still a strong and thriving unique organization both in size and philosophy, in the veterinary world. Hahaklait is a non-profitable organization, still owned and managed by the farmers for their benefit. Our basic goal is to give our clients the best veterinary service at a reasonable cost. Each farm pays a yearly fixed rate per animal in order to cover all routine and emergency medical needs. Thus, Hahaklait has a long term and stable contract with the farm, and is committed to the well being of the animals, as well as to the sound economy of the farm.

Our Services

Hahaklait believes in intensive service at all levels: sick individual cows, herd health, prevention and control of infectious and production diseases, as well as food safety and animal welfare. Our vets visit each farm two to three times a week, and each cow receives several routine visits per lactation, to make sure she is producing at maximal efficiency. Cows are checked after calving for both clinical and sub clinical diseases, for reproductive status and before drying up. All the data from each individual cow is collected at the farm and processed by Hahaklait. Hahaklait is also supporting and performing clinical field trials.

Our Clientele

Hahaklait serves 900 dairy farms with over 90,000 milking cows, which comprise more than 80% of the dairy cattle population in Israel. These are made up of 190 large Kibbutz herds and 700 smaller Moshav (family) dairy farms. There are approximately 50 beef herds with 20,000 dams and some 250 feedlots with 30,000 steers, as well as 200 sheep and goat farms. The horse population, once the vehicle of our early Vets and a valuable farm force, is now a small portion of our work (1,000).

Our Personnel

Thirty-eight of Hahaklait vets serve as district practitioners throughout Israel.

Ten junior vets operate as relief for the district vets and for special tasks. Hahaklait employs a full time dairy nutritionist for ration planning and troubleshooting. Some of our vets operate part time as consultants for: Dermatology, Parasitology, lameness, young stock, radiology, beef and feedlot and ovine. Our epidemiology department produces a monthly and annual herd report for each farm, monitoring and analyzing its production and reproduction performance. Our herd Health experts meet with the manager and staff of every farm to present and discuss their discoveries and advise them regarding future improvements.

Drugs

Since almost all veterinary drugs in Israel are imported, Hahaklait handles registration, importation and distribution of a wide range of remedies, vaccinations and equipment. In order to perform this task, Hahaklait operates a large and modern central drug store. Being the dominant drug buyer in the country and one of the largest veterinary groups in the world, we can offer our clients very competitive wholesale prices. In addition, drugs are sold without any surcharge. We advocate the minimization of drug use and the prevention of drug residues from entering into the food chain. Hahaklait strongly believes that its intensive farm visits and herd-monitoring activities reduce our clients' drug use and thereby drug costs.

Our Affiliations

Hahaklait Head Office and its Chief Vet keep close ties and work relations with the following bodies: The Milk Board, the Israeli Cattle Breeders Association, the National Herd Book, Sion (the A.I. organization), the Milk Quality and Udder Health Lab, The National Veterinary Services and the Kimron Veterinary Institute, the Koret Vet School of the Hebrew University, the Ministry of Agriculture Extension Service and some other international organizations.

Hahaklait promotes various means of continuing education for our vets and clients, in the form of conferences, meetings and formal studies, to keep them up-to-date with the vast changes in veterinary knowledge.



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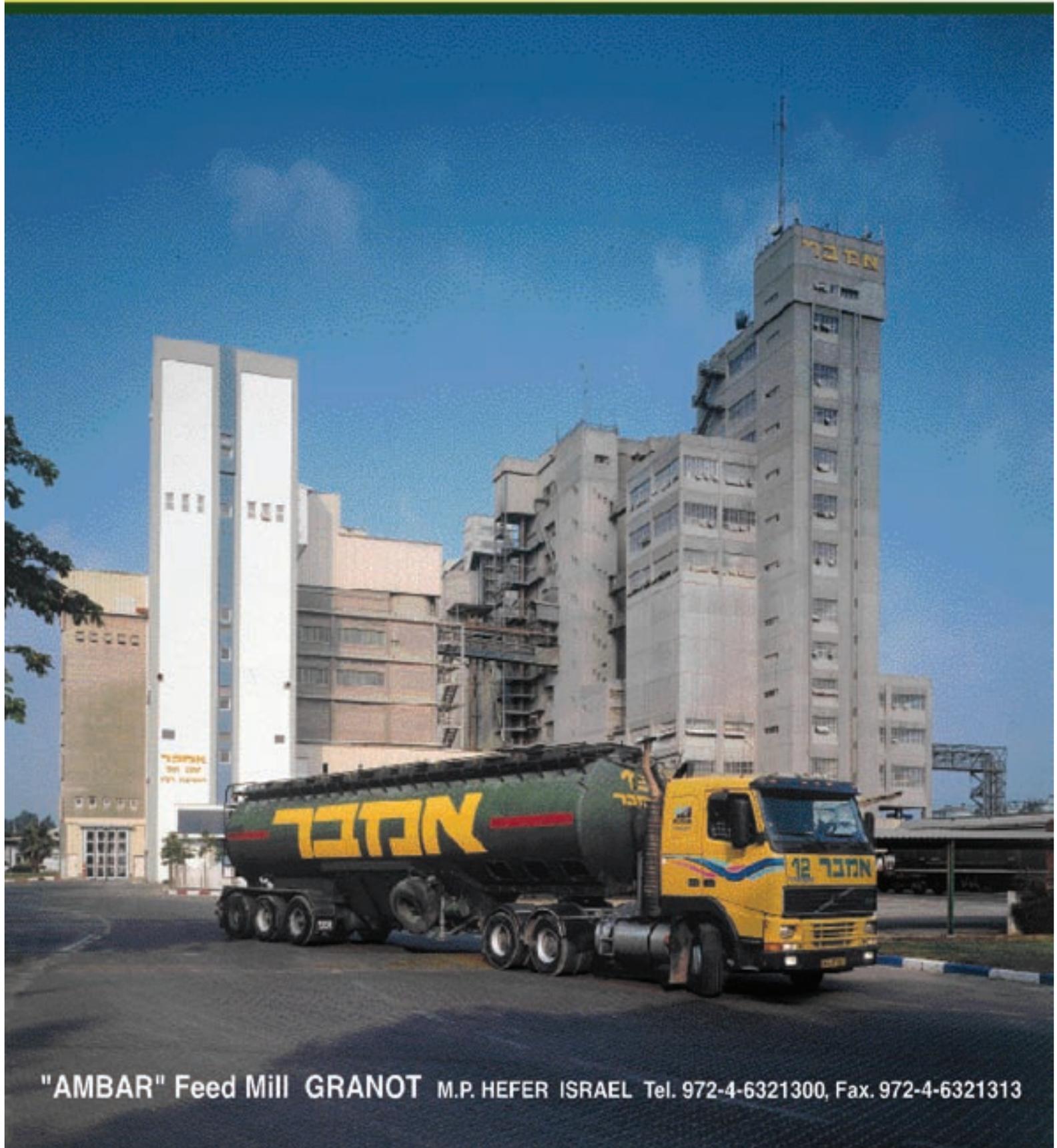
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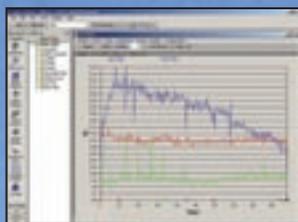
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The Dairy Industry in Israel 2003



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