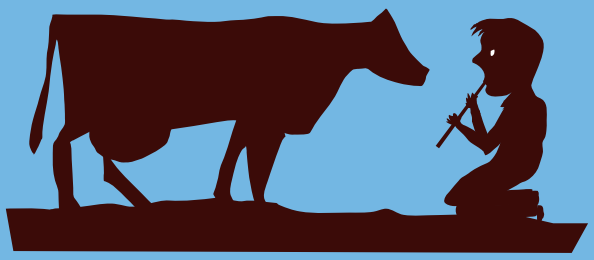

THE DAIRY INDUSTRY IN ISRAEL 2004

Israel Cattle Breeders Association

Israel Dairy Board

The Dairy Industry in Israel 2004

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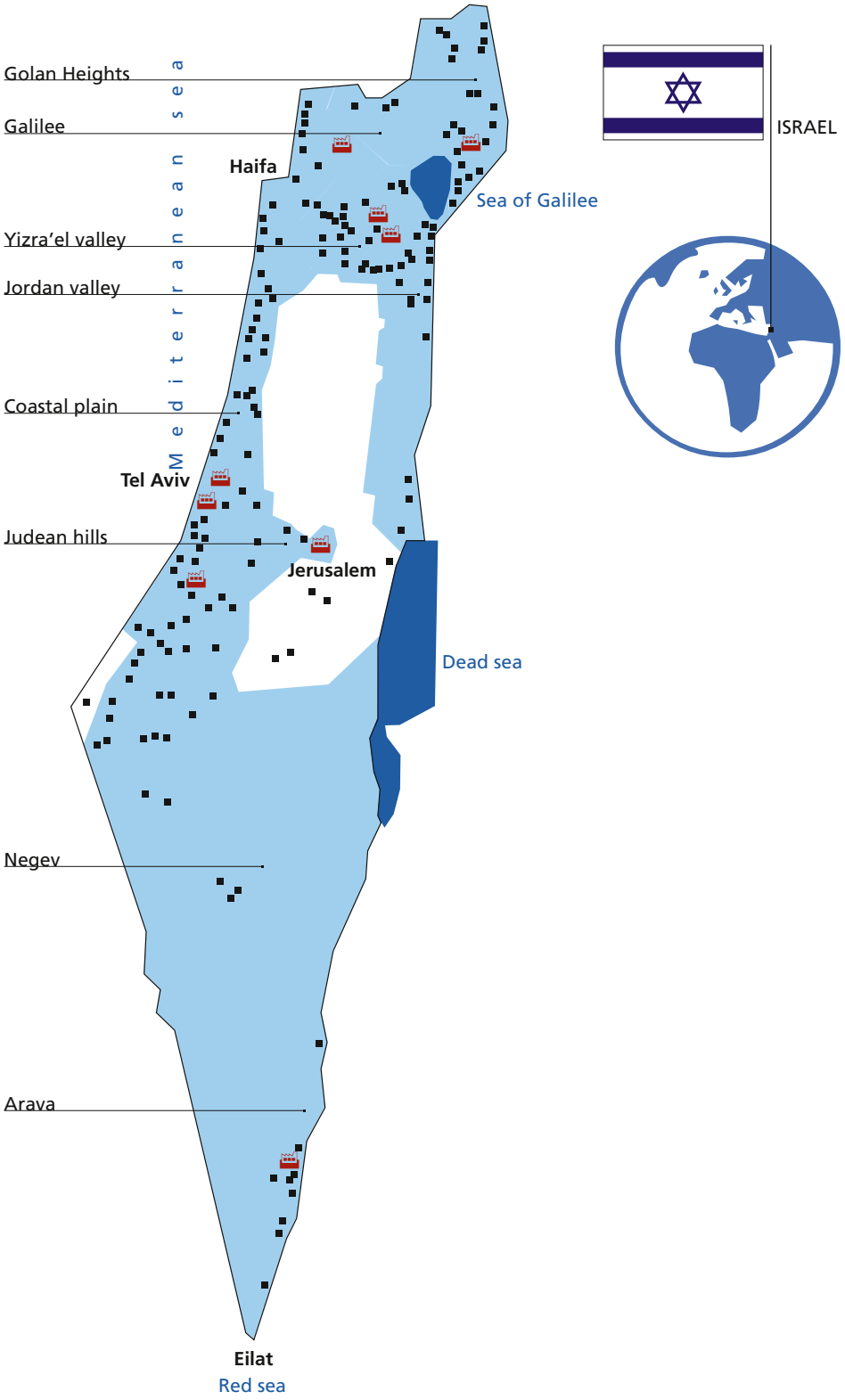

The Dairy Industry in Israel

The Dairy Industry is one of the main sectors of Israeli agriculture, and supplies the entire domestic demand for milk and dairy products. Israel has a total annual output of approx. 1,146,000 tons of cow's milk; 10,500 tons of sheep's milk; and 5,400 tons of goat's milk.

Dairy Enterprises process the raw milk into more than 1,000 different dairy products, with an annual value of approx. $1.5 billion.

Milk is produced on over 1,000 farms, spread countrywide (in the heights, the valleys and the desert) on kibbutzim (cooperative societies) and moshavim (private farms).

The national dairy herd is comprised of 111,000 head of the Israeli-Holstein breed, which has been developed by the Israeli Genetic Improvement System. Since this cow has been selected for generations in the harsh conditions of the Israeli climate, it is very well adapted to the local climatic environment, characterized by a long and hot summer, and to local diseases. Nearly all the cows are bred by A.I.
The Israeli Herdbook (DHI), receives and processes information from the official Milk Production Control System, which includes 90% of the dairy cattle in the country. In addition to production figures, the Israeli Herdbook incorporates information from the Breeding System and from the "HaChaklait" Society for Veterinary Services. The comprehensive structure of the Israeli Herdbook provides the farmer with useful multi-disciplinary information that is used for up-dated management analyses and decision-making processes, which have led to outstanding world-scale achievements. Indeed, the Israeli cow has the highest national milk yield (production/cow/year) in the world in milk volume and also in milk solids. In 2004, the average annual milk yield per cow was 10,668 kg of milk, 331 kg of protein and 381 kg of fat.

We are pleased to present you with this summary of the Israeli Dairy Industry for 2004 and hope that this brochure will help acquaint you with this progressive and successful branch of Israeli agriculture.

Sincerely,

Shayke Drori
Israel Dairy Board
General Manager

Meir Brawn
Israel Cattle Breeders Association
General Manager

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Table 1.1

Israel and its agricultural sector

Population	6.80 million inhab.
GDP per capita	17,270 US$
GDP of Agricultural Sector	1.62 US$ billions
Share of Agriculture in National GDP	1.4 %
Share of Agriculture in the Business Sector GDP	2.0 %
Direct Employment in Agriculture, as share of National Labor Force	2.5 %
Self-sufficiency of Agricultural Products	80.0 %

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Table 1.2

Marketing value of agricultural products. Value as received by productor (NIS millions)

1 $US= NIS 4.482

Crops	10,618	60 %
Livestock and livestock products	7,008	40 %
TOTAL	17,626	100 %
Raw milk (% of Total)	1,918	11 %

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. Those 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 2004 accounted for 1.4% of the GDP.

Some 70,000 people were directly employed in agriculture in 2004. This number represents 2.5% of the country's total labor force. The average monthly income per agricultural employee was $2,100 in 2004.

The Israel Dairy Board Production & Marketing

Liron Tamir____I.D.B., Senior Economist

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.

The Israeli Dairy Processing Industry

Doron Zilcer____Tnuva Dairy Industry, Supply Chain Manager

The Israeli Milk Industry was founded in 1926, by the time "Tnuva" was launched as a cooperative with the purpose of handling milk production. Ever since then, "Tnuva"' has been the largest and the leading producer of milk in the country. It has provided stability to the dairy sector and promoted its growth, to the point that in 2004 a total of 1,140,000,000 liters of milk were delivered.

"Tnuva"'s Milk Division elaborates a wide variety of milk products:

- Fluid milk & milk beverages
- Hard cheeses
- Yogurts & sour drinks
- Dairy delicacies
- Soft cheeses & cottage cheeses

"Tnuva"'s dairies receive and transform 850 million liters of milk into dairy products annually. The winter milk surplus is converted into milk powder and butter. In 2004, 7,300 tons of milk powder were produced. "Tara" and "Strauss" Dairies collect and process 120 million and 115 million liters of milk per year, respectively.

In addition, 54 small dairies in Israel collectively produce 40 million liters of milk annually.

Over the last 5 years, the Israeli milk industry has passed comprehensive reforms that include: Specialization and renovation of most dairy plants. Construction of the "Alon Tavor" plant, a modern milk processing facility that is the most advanced in the world, equipped with state of the art technology and automation (see photo below).

As the Alon Tavor dairy plant became operational, "Tnuva" closed the Tel-Aviv and Haifa processing plants, and converted the Rehovot facilities into a dairy plant specializing in milk and dairy beverage production. Moreover, the company has renovated production lines specializing in hard cheese processing at the Tel-Yosef dairy plant, salty cheeses at the Tene-Noga plant and at the Jerusalem dairy, that is geared towards the stricter kosher regulations for the ultra-orthodox market.
"Strauss" has established a new dairy facility in Ashdod and Netivot and has renovated its Yotveta plant. "Tara", recently bought by the Coca-Cola Company is planning to establish a new dairy plant in the south. Many small dairies are also undergoing a renovation process.

The milk industry has also modernized its storage and distribution capabilities, moving from small storerooms in the inner cities to large automatic logistics centers where the extensive variety of products are stored and organized for distribution throughout Israel (see below the Petach-Tikva Logistics Center).

All the new sites are ecologically friendly. For example, recycling has been largely implemented. A good illustration of this approach has been the construction of a new factory to process whey, the "Ba'emek" plant, which collects whey from all the dairies and produces milk protein and lactose. Other improvements relate to quality control and strict

regulations to avoid risking any health hazards.
The produced raw milk meets the highest international quality standards. Milk transportation specifications have been set to preserve the quality of the product delivered by dairy farmers that can compares to with the highest international standards.

Production lines at dairy plants use state of the art cleaning technologies, to maintain milk quality levels and extend the shelf – life of products.
Finally, distribution of processed products has been upgraded: delivery trucks are fully refrigerated and equipped with cooling control.

This updated dairy industry, distinguished by innovative packaging and a large variety of products, are both the result of intense competition and concern for the consumer's welfare. Strong emphasis is placed on the consumer. In fact, the customer's satisfaction is our main goal.

The intense competition and the limited size of the Israeli market have encouraged the largest dairies to initiate activities overseas. Currently, milk products are exported to the United States market, especially for the kosher consumer sector.

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Table 2.1

No. of dairy farms, by farm type, and average annual milk quota per farm

	1998	1999	2000	2001	2002	2003	2004
Family farms (Moshav)							
Number	1,211	1,175	1,091	1,025	962	921	880
Average quota (x 1,000 ltrs.)	390	402	439	492	511	524	541
Cooperative farms (Kibbutz)							
Number	218	216	214	209	200	196	187
Average quota (x 1,000 ltrs.)	2,939	2,966	3,036	3,273	3,335	3,344	3,524
Agric. School farms							
Number	16	16	16	16	16	16	16
Average quota (x 1,000 ltrs.)	703	703	713	750	731	719	733
Total							
Number of farms	1,445	1,407	1,321	1,250	1,178	1,133	1,083
Average quota (x 1,000 ltrs.)	778	799	863	960	993	1,015	1,059

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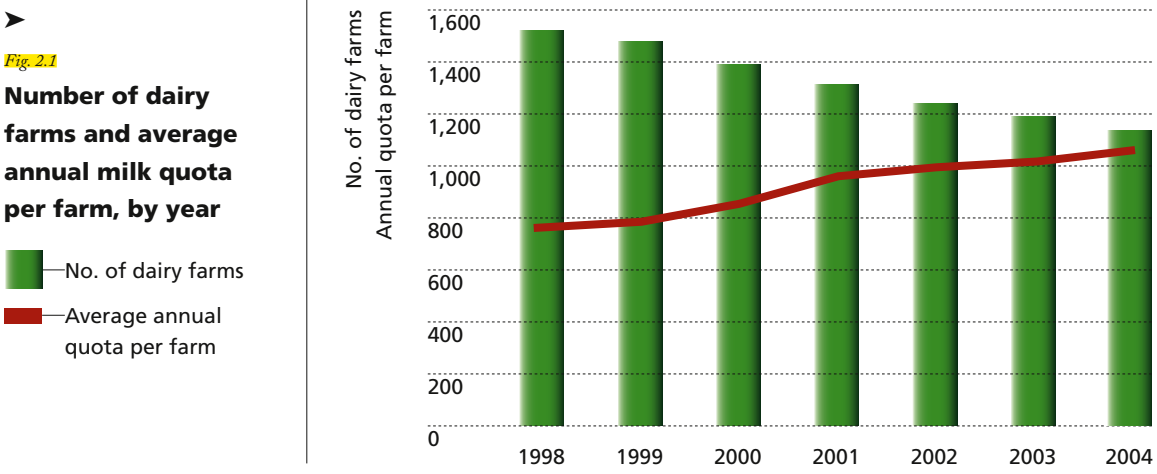
Fig. 2.1

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



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. Theses 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 62.4% of the cows with recorded production. Their average milk yield in 2004 was 11,058 kg/cow/year and the average production of protein and fat was 740.4 kg/cow/year. Approximately 75% of the Moshav dairy herds participate in the DHI system and represent 37.6% of the cows with recorded production. Their average milk yield in 2004 was 10,008 kg/cow/year and the average production of protein and fat was 662.5 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 level-up production along months, so that milk supply to the industry is more even along the year.

The "basic" price for the milk to the producer results from an agreement between government, farmers and dairy industries. The price reflects the average cost of production plus an agreed return for the farmer's labor and invested capital.

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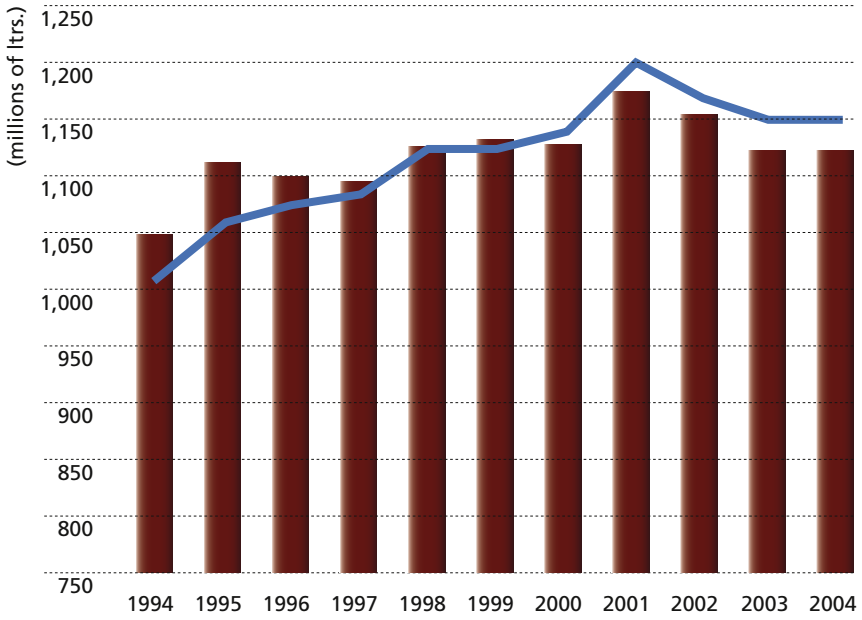
Table 2.2 & Fig. 2.2

Cow milk – Annual supply and quota

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
2004	1,146	1,150



National Service for Udder Health & Milk Quality

Shmuel Fridmann____Israeli Dairy Board, National Service for Udder Health and Milk Quality

The National Service for Udder Health and Milk Quality is a non profit organization, whose objective is improving the udder health and milk quality of all milk producers (cows, sheep & goats) in Israel.

Founded by the Israel Dairy Board, ICBA, and the Dairy Industry, the National Service was streamlined in 1997 from five regional laboratories to its present form. The organization today consists of two Regional Mastitis Control Laboratories and the Mastitis Reference Center at the Kimron Veterinary Institute. The headquarters and the northern laboratory are situated in Caesaria. The laboratory serves approximately 60% of all herds, between the Golan Heights and the Tel Aviv area. The southern laboratory in Masmiya serves all herds south of Tel Aviv and as far as Eilat.

The National Service is funded by the Israel Dairy Board. Services are provided to all milk producers by virtue of a tax on each litre of marketed milk, with no further payment from the producers.

The following services are provided to all dairy herds:

- Laboratory diagnosis and services
- Periodic sampling and analysis of all dairy herds.
- Analysis of samples from mastitic cows sent by dairy farmers.
- Analysis of samples sent by farmers from pre-partum cows for sub-clinical mastitis.
- Antibiograms providing information to the clinical veterinarian.
- Evaluation of teat dip samples from dairy herds.
- Bulk tank analysis for Strep. Agalactiae.
- Analysis of bedding samples.
- Analysis of water for Pseudomonas.
- Progesterone levels in milk (additional service paid for separately).

Udder Health

- Tracing and planning the eradication of contagious mastitis e.g. Strep. Agalactiae, Staph. Aureus.
- Advice during the eradication phase.
- Advice to producers with high Somatic Cell Counts and/or high cell plate counts.
- Planning, implementation, and follow up on programs to combat mastitis in individual cows and on a herd basis.

Analysis of milking parlors and milking equipment

- Advice on milking parlor construction.
- Advice to dairy farmers on milking machine specifications.
- Supervision of companies supplying milking equipment, teat dips and detergents.
- Static and dynamic testing of milk parlors.
- Milk parlor trouble shooting.

Education

- Advice on laboratory facilities and laboratory examinations.
- Organization of workshops.
- Publication of technical news letters.
- Promotion of research projects.
- Conducting of field studies.
- Advice, co-ordination, and follow up of all services provided.

Table 2.3 & 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	59.3
Grade A	230,001 – 300,000	27.2
Grade B	300,001 – 400,000	10.7
Grade C	401,000 – 500,000	2.0
Grade D	501,000 – 600,000	0.7
Total		100.0

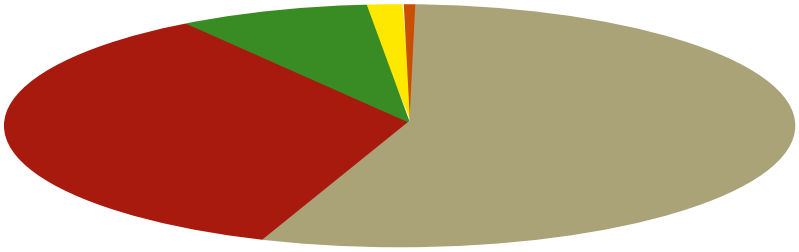


Table 2.4 & Fig. 2.4

Milk supply, by bacterial count categories, in 2003

BACTERIAL COUNT		
Quality Grade	**Count per ml**	**% of supplied milk**
Premium	Less than 30,000	73.8
Grade A	30,001 – 100,000	25.1
Grade B	100,001 – 150,000	0.5
Grade C	151,000 – 250,000	0.6
Total		100.0

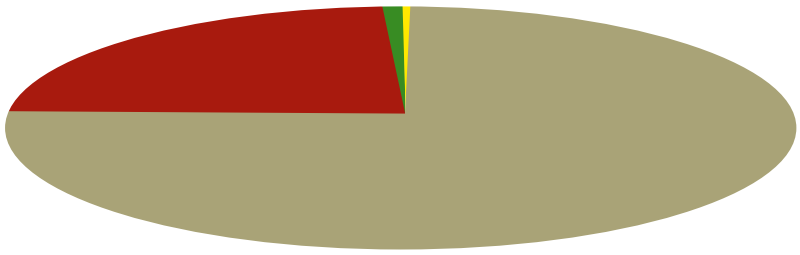


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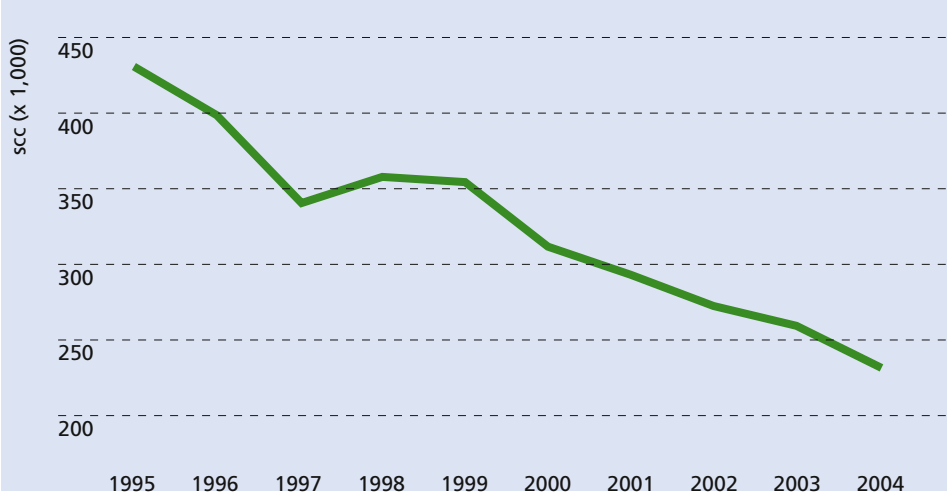
Fig. 2.5

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 259,000 in 2004.

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 10.4 million kg of sheep milk and 5.4 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.

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Table 2.5

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
2004	10,446	5,407

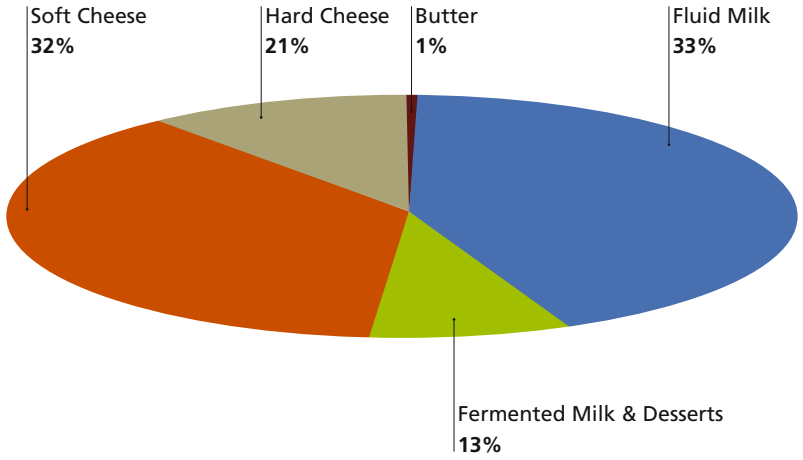
Table 2.6

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

	Cow Milk					Sheep & Goat Milk	
Year	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
2004	370,266	146,820	80,703	22,813	5,713	1,266	1,200

Fig. 2.6

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



Feeding Dairy Cows in Israel

Ofer Kroll____Hachklait Veterinary Services, Senior Nutritionist

Until the end of the 50's, most of the dairy herds in Israel were relatively small. Dairy barns were of the stanchion-stall type for the most part, with 110-cm manger space per cow. Each cow had its individual place where she ate, rested and was milked. This type of building lent itself to individual feeding, each cow receiving a portion of concentrate and/ or forage several times a day, mainly according to yield. As number of cow's increased and central milking parlors gained popularity, herds were divided into groups. Grouping was done according to stage of lactation and yield. With this system and especially as a result of crowding cows into the various groups, it became clear that every cow that calved and entered the highest group pushed out another into a lower group almost automatically. This system proved damaging to the milk yield of the transferred cow and was of special disadvantage to the younger and relatively smaller cows that were unable to match the older cows in the competition for feed.

It is well known that young cows have a relatively greater persistency of milk yield during their lactation, and if deprived of sufficient feed their development and growth will suffer. Many farms today separate heifers from more mature animals. For these young cows one uniform level of feeding is being practiced and little attention is paid to feeding norms, on the assumption that whatever feed was offered above requirements for milk yield would be utilized for growth, this producing a better mature animal. The general approach in Israel today is of maintaining 2 feeding groups: one for early lactation and one for the rest of the milking cows. In family farms, the one-diet method is the most popular. Liberal feeding, mainly with TMR mixer and minimum transfer of cows between groups is the preferred feeding method in Israel.

Ration Programming and Feeding Practices

Optimal planning and rationing have always been desirable goals from a professional and economic point of view; however, one should take care in adjusting planning to management.

Feed Intake

The system of group feeding, carried-out with the use of the weighing mixer wagon, represents an important management tool for dairy and beef farms. As well as improving feed efficiency and rumen fermentation, it provides control of feed intake.

It has been shown that an average daily feed intake, expressed in dry matter, ranges from 3.0 to 3.5% of body weight and depends on milk yield, days after calving, ration composition, NDF content, forage: concentrate ratio, practical size and density of ration. In Israel, the influence of the summer climate also has a profound effect, contributing to a 10-15% decline of feed intake in summer, as compared to winter.

Feed intake, especially with cows at peak lactation, constitutes the major limiting factor to feeding and the provision of nutrients. This is the starting point in any system of rationing and planning. Perhaps once we have at our disposal protected proteins and fats we shall be able to overcome the limitation of conventional energy intake.

From feeding TMR ad-lib, we have data of feed intake for the group but not enough data on the intake of individual cows. It appears that the maximum individual intake by high yielding cows reaches up to 4% of their body weight (or NDF up to 1.3% of body weight).

Energy Level

Until the end of the seventies, the Scandinavian feed unit was commonly employed for rationing in Israel. It used the average norm of 5 feed units a day for

maintenance and 0.3-0.4 feed units per 1 kg of milk. As the available amount of roughage is limited, this led to feeding cows 17-18 kg of concentrate per day, resulting in lower feed efficiency. With the increased use of the metabolic and net energy (ML, NEL) systems and their higher evaluation of roughage, the importance of roughage has become more emphasized. Evidently, the manipulation of the feeding level cannot be achieved by changing the amount of concentrates alone.
Today it is common to use the ME/ NE system for energy evaluation and NDF or ADF for intake and energy estimation.
NRC 89-01 in addition to local experience, is the main guideline for feeding high-producing dairy cows, but under low quantity/ low quality roughage conditions, high energy concentration is common practice.
The energy concentration for high yielding cows under Israeli conditions is about 1.75-1.76 Mcal NEL kg DM diet. Fat content is use of between 3% to 5%, and various sources of starches are always included.

Protein

500-550 grams of crude protein for maintenance and about 70 gram per kg milk were a typical allowance. To day, In the TMR system 16%- 16.7% crude protein is the requirement for high yielding cows (in summer and winter, respectively). About 34%-36% of the total protein is from UIP (Undegradable Intake Protein) and a large variety of protein sources are a common solution to cover the needs for the different amino acids.

Fiber

Under Israel's conditions of feeding, it is important to estimate the animal's requirement of NDF, which will allow normal rumen function. The use of intermediate feeds, such as wheat bran or orange peel, takes the amount of NDF to a total of 6-6.6 kg per cow per day (30%-34% of total dry matter), but with forage NDF not more than about 3.4-3.6 kg (17%-18% of total dry matter). Particular attention must be paid to the physical structure of feeds; straw, when finely chopped looses some of its efficiency as roughage.

Additional Measures

For the calculation of the correct composition of rations, especially when using computers, there are a number of basic assumptions regarding local conditions, which may not have any justification in literature or in research but which appear, from farm experience, to have an influence on feed intake and performance.
Intermediate feeds: feeds containing large amounts of highly digestible carbohydrates, such as orange peel are limited to 15%. In this group of foodstuffs one can include liquid whey, nowadays used extensively in dairy feeding.
Under summer conditions (high temperatures and humidity) intake declines. It is recommended to provide better quality forage to minimize climatic effects. Also, cooling cows by the use of sprinklers and ventilation can reduce body temperatures by 1°-2° C.

General Observations

Liberal feeding of dairy cows is the practice in Israeli daring since the 50's. The aim is to utilize the genetic potential of the animal to the fullest.
The main problems to be dealt with remain:
-How to increase intake and energy supply to animals.
-How to deal with the problem of digestibility of feeds especially when very good forage is not available or in very short supplies
-How to balance maximum yields with maximum profit.
It seems that simple and properly balanced diets, minimum transfer of cows between groups, with the help of good housing, health control, fertility and breeding are the key to success for any dairy farm.

Summer-to-Winter Production Ratio

A tool to Evaluate the Efficiency of the Hot Season Management by Dairy Farms

Israel Flamenbaum____Ministry of Agriculture, Extension Service
Ephraim Ezra____Israel Cattle Breeders Association (ICBA)

Due to the harsh summer conditions in Israel, the use of cooling methods in dairy farms has become an important tool for increasing milk production efficiency. A Summer-to-Winter Production Ratio, which uses data from the "Israeli Herdbook", was developed as an indicator of the efficiency with which farm managers reduce the summer's negative impact on cows' performance. This parameter is applied in the present research to evaluate the achievements of Israeli dairy producers to overcome the detrimental effects of the hot season on cows' performance.

Increased summer milk yield and fertility, and reduced seasonality of milk supply to the dairy industry are some of the main goals of the Israeli dairy sector. In the last three decades, new cooling methods and summer management practices were developped and largely introduced to dairy farms all over the country. The Extension Service of the Israeli Ministry of Agriculture in cooperation of the Israel Cattle Breeders Association (ICBA) have cooperated for many years to take advantage of the "Israeli Herdbook" data, and use it to evaluate the efficiency of the different cooling methods, through field experiments and large scale surveys.

The "Summer-to-Winter Production Ratio" which has been developed, is based on the monthly yields measured by the Milk Recording System. The ICBA computer creates a "virtual" production curve for cows that have calved in the summer (July – September) and winter (January – March) season and calculates a "seasonal average" of production for every herd.

The resulting figures are the basis for calculating the "Summer-to-Winter production ratio". This ratio can be used by the individual farmer to evaluate his efforts to reduce heat stress in the farm, as well as by farmers organizations, government agencies and dairies while making policy-making decisions.

Lately, after having used this parameter for evaluating results of surveys and experiments dealing with cooling methods, we decided to calculate this ratio annualy for each dairy farm in Israel to evaluate results of the intensive use of "summer management practices" and the introduction of cooling methods.

Using this method we have compared results of this Summer-to-Winter production ratio between the years 1994 and 2004 in order to learn about the changes and advances in Israeli dairy farms with relation to improving cows' performance in summer.

The following report presents the Summer-to-Winter production ratio for average corrected* daily yields of ECM (Economic Corrected Milk) obtained in summer and winter.

The higher this ratio is (close or above 100%), means that summer production is relatively good, and that the farm is dealing well with the summer heat-stress (or that it is one of those fortunate farms located in highlands, which benefits from a relatively mild summer).

672 dairies participated in this survey, 184 of which are Kibbutz (cooperative, large scale dairies) and 488 (moshav, family farms, relatively small sized dairies).

In **table 1** Summer and Winter averages of corrected ECM daily yield and the Summer-to-Winter production ratio for the two kinds of dairy farms in 1994 and 2004 are presented.

* Data was corrected for age, DIM and reproductive status of cows.

Year	No. of Lactation	Cooperative farms			Family farms		
		Winter	Summer	S:W ratio	Winter	Summer	S:W ratio
1994	1	31.5	28.4	90.1%	26.8	25.1	93.6%
	2	36.2	30.5	84.2%	30.6	27.1	88.5%
	3	37.7	31.0	82.2%	32.2	27.7	86.0%
2004	1	31.9	31.2	97.8%	28.9	28.3	97.9%
	2	38.0	35.8	94.2%	33.8	31.4	92.9%
	3	39.8	36.5	91.7%	36.0	32.3	89.7%

*Table 1*_____**Summer and Winter averages of corrected ECM daily yield and the Summer-to-Winter production ratio for the two kinds of dairy farms in 1994 and 2004**

Results show a significant improvement in Summmer-to-Winter production ratio in the last 10 years.
First-calvers have almost closed the gap and reached production levels in 2004 very similar to winter first-calvers. For adult cows, summer production levels in 2004 reached 90% of winter levels, and for cooperative farms this rate was almost 10% more than the 1994 level.
Distribution of dairy farms regarding the Summer-to-Winter ratio, for the two dairy production sectors, is presented in **table 2**.
Data in **table 2** show that 93 farms (almost 15% of the total farms in Israel) have a Summer-to-Winter ratio greater than 100%. A large portion (nearly 40%) of the farms, achieve a ratio ranging between 91- 96%. A relatively higher percentage of family farms, compared to cooperative farms, have Summer-to-Winter production ratios below 90% (25% and 16%, respectively). This possibly represents poorer installations and/or implementation of summer management and cooling methods in farms of this sector.
The influence of the geographical region, and level of winter ECM production on Summer-to-Winter production ratios was also studied in this survey.
To determine the influence of the geografical region on cows' performance, the 2004 Summer-to-Winter ratio was calculated for two groups of cooperative dairy farms located in the Jordan Valley (a relatively hot area) and a group of dairy farms located in the highlands of Israel (relatively cool). Data concerning these two groups and the average of all of the

	Cooperative farms		Family farms		Total	
Summer-to-Winter Ratio (%)	No. of Farms	% of total	No. of Farms	% of total	No. of Farms	% of total
Above 100%	27	15%	66	13%	93	14%
100% – 96	49	27%	128	25%	177	26%
95% – 91	78	42%	185	37%	263	38%
90% – 86	28	15%	108	21%	136	20%
Below 86%	2	1%	19	4%	21	2%
No. of farms	184	100%	488	100%	672	100%

*Table 2*_____**Distribution of dairy farms regarding Summer-to-Winter ratio, for the two dairy production sectors**

cooperative dairy sector is presented in **table 3**.
To examine the influence of milk production level in the Summer-to-Winter production ratio, we compared results of dairy farms from both sectors in which the winter average production exceded 37 kg ECM/d and those whose average winter production was below 31 kg ECM/d. Results are presented in **table 4**.
Figures in tables 3 and 4 show that hot climate conditions and high winter level of production have a negative impact on the ability of the individual dairy farm to reach high Summer-to-Winter production ratio.
The data presented in these tables indicate that the parameter of the Summer-to-Winter production ratio must be implemented carefuly, and that operative steps must take into account important factors that can influence this ratio.
In conclusion, this article presents the use of the Summer-to-Winter production ratio as a parameter to evaluate the efficiency of milk production achieved in the summer in relation to winter levels. This ratio can be used to verify the effects of the implementation of anti heat-stress measures.
Furthermore, this index pinpoints to the professional and economical achievements that can be obtained by cooperation between Extension Services and the "Herdbook" data-bank, for the benefit of both the Israeli dairy farmers and the consumer.

	Hot region	Cool region	Total Cooperative dairies
Total dairy farms	24	28	184
Summer-to-Winter ratio > 96%	30%	70%	42%
Summer-to-Winter ratio < 90%	30%	5%	16%

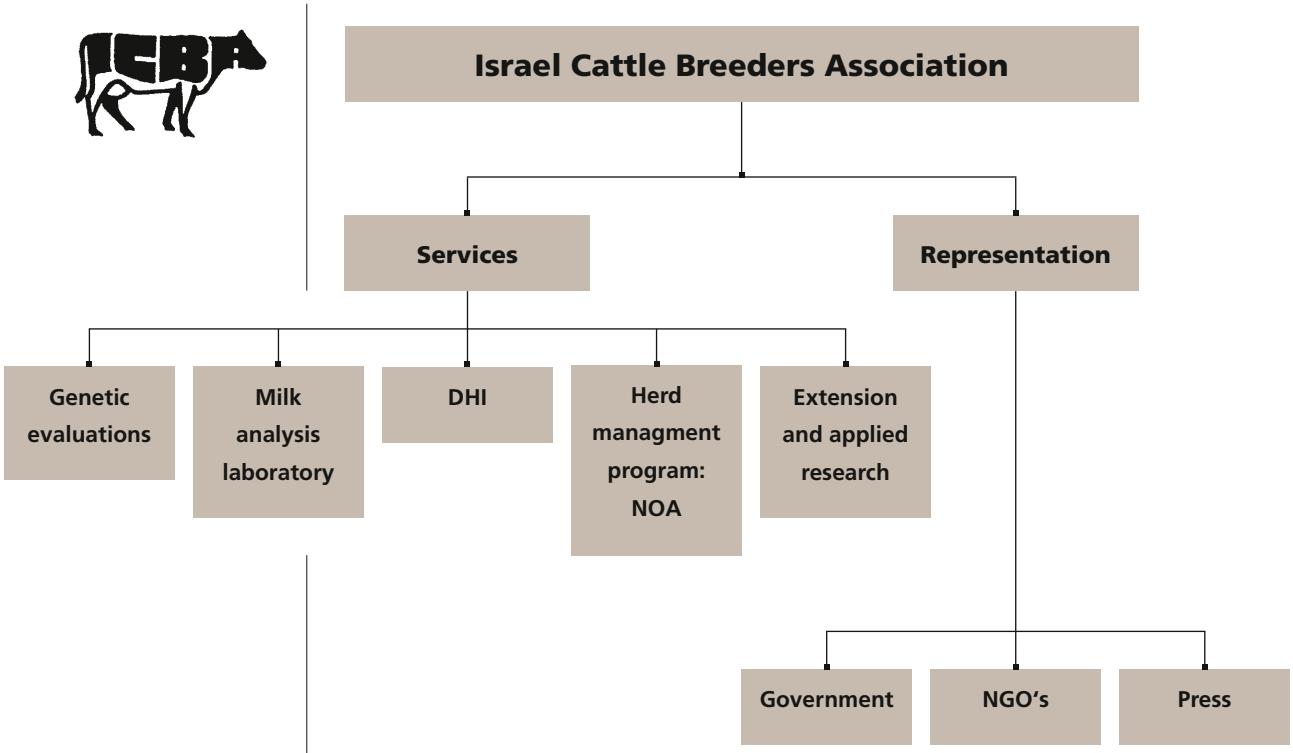
Table 3 **Summer-to-Winter production ratio in 2004 for cooperative dairy farms located in hot and cool regions of Israel**

	Winter average > 37 Kg ECM/d	Winter average < 31 Kg ECM/d	Total dairies
Total dairy farms	100	100	694
Summer-to-Winter ratio > 96%	19%	57%	32%
Summer-to-Winter ratio < 90%	27%	4%	17%

Table 4 **Summer-to-Winter production ratio in 2004 for dairy farms with winter average production over 37 Kg ECM/d and under 31 kg ECM/d.**

The Israel Cattle Breeders Association

Yossi Malul____ICBA Publishing Department Editor



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.

The ICBA Database

Ephraim Ezra____ICBA, Herdbook Manager

In 2004 the Israeli Dairy Herdbook collected information from 99,537 cows in 775 herds, 90% 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. institute 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 cows), recording is done monthly by an ICBA representative (A4 method), who records the relevant information on a hand-held terminal. On the remaining 30% of cows, 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.

- **Central milk laboratory** – This laboratory, presently equipped with three FOSS analyze-instruments, analyzes milk components (fat, protein, lactose, SCC, MUN and casein rate) 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 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.

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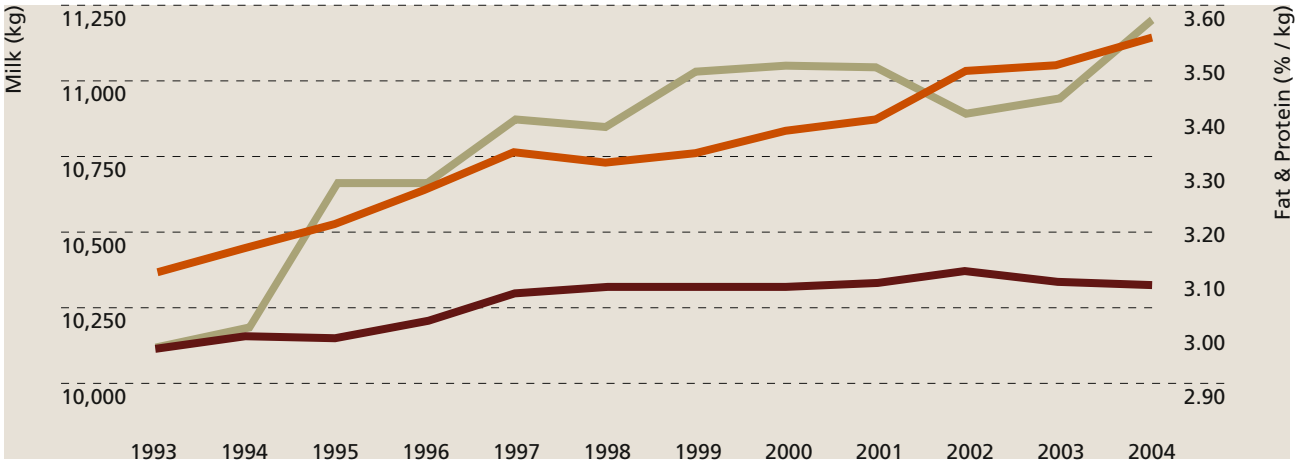
Table 3.1 & Fig. 3.1

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
2004	84,694	11,200	3.54	3.08



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 0.53% and 0.18%, respectively. Until the year 2000 there was a constant increment of average annual milk yield per cow, then a slight decline and in the last two years a renewed increase.

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Table 3.2

Production averages in 2004, by parity number

	1st lactation cows	2nd lactation cows	Adult cows	Total
Complete lactations				
No.	24,018	16,490	22,967	63,475
Milk yield, kg	10,817	12,203	12,695	11,855
ECM* yield, kg	11,018	12,365	12,572	11,930
Fat yield, kg	392.5	438.8	448.7	424.8
Fat, %	3.63	3.60	3.53	3.58
Protein yield, kg	342.8	385	389.1	370.5
Protein, %	3.17	3.15	3.06	3.12
Adjusted 305-d lactations				
No.	23,240	15,933	22,224	61,397
305-d adjusted ECM, kg	10,952	11,185	11,068	11,054
Days in milk	360	352	350	354
Milk yield, kg/day in milk	30.0	34.7	36.2	33.4
Calving interval	424	417	417	420
ECM yield, kg/cow in herd-day	26.0	29.6	30.2	28.4
Dry period, days	64	65	66	65
Days open	149	141	141	144
Calvings				
Total No. of calvings	33,572	24,976	40,638	99,186
Calves born	33,900	26,122	43,302	103,324
Age at calving, months	25	39	66	45
Normal calvings	29,764	23,614	38,501	91,879
Normal calvings, %	88.7	94.5	94.7	92.6
Premature calvings	609	498	849	1,956
Premature calvings, %	1.8	2.0	2.1	2.0
Abortions, %	9.2	9.1	8.0	8.7
Stillborn calves, %	8.5	6.3	7.1	7.4

* ECM = Economic Corrected Milk, according to the formula for milk payment:
0.1 * kg Milk + 7.67 * kg Fat + 20.21 * kg Protein

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Table 3.3

20 cooperative herds with highest average annual milk yield per cow (3x milkings) in 2004

	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
1	Carmiya	12,813	12,501	3.64	3.21	854	207	287
2	Sa'ad	12,633	12,422	3.63	3.17	843	212	285
3	Habonim	12,528	12,098	3.73	3.22	840	236	236
4	Yavne	12,520	12,404	3.60	3.14	835	112	363
5	Nachal Oz	12,519	12,361	3.63	3.15	837	195	269
6	Nir Yitzhak	12,373	12,420	3.58	3.08	827	200	254
7	P.R.Ch.	12,348	12,300	3.63	3.10	827	195	435
8	Ein Carmel	12,319	12,272	3.59	3.11	822	377	254
9	Carmel Ma'on	12,296	12,191	3.59	3.14	820	214	419
10	Ma'ale HaKhamisha	12,205	12,120	3.59	3.13	814	197	246
11	Ma'ale Gilboa	12,172	12,236	3.41	3.14	800	259	242
12	Gan Shmuel	12,147	11,881	3.72	3.16	816	254	288
13	Nirim	12,101	11,890	3.60	3.18	805	211	247
14	Tze'elim	12,087	11,847	3.71	3.15	812	202	245
15	Be'eri	12,068	11,878	3.67	3.14	809	210	272
16	Alumim	12,058	11,981	3.71	3.08	813	178	284
17	Shomriya	12,027	11,974	3.68	3.09	809	202	209
18	Alonei HaBashan	12,015	11,948	3.54	3.14	798	273	236
19	Hof HaSharon	11,943	11,856	3.62	3.12	798	146	901
20	Beit Yatir	11,912	11,973	3.56	3.08	794	223	224

Table 3.4

20 Family herds with highest average annual milk yield per cow (2x + 3x milkings) in 2004

Village	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
Givat Yoav	Sofer Farm	12,454	12,311	3.54	3.17	826	130	42
Givat Yoav	Eliezer Farm	12,439	12,069	3.76	3.19	837	101	45
Givat Yoav	Tzafrir Farm	12,246	11,961	3.72	3.17	823	136	46
Givat Yoav	Ben Yosef Farm	12,227	11,743	3.82	3.22	825	137	40
Kefar Yehezkel	Vered Farm	12,175	12,130	3.73	3.06	823	160	62
Givat Yoav	Golani Farm	12,173	11,987	3.70	3.13	818	216	52
Sde Ya'akov	Baranawski Farm	12,139	12,046	3.57	3.14	808	116	105
Amatz	Sahar Farm	12,094	11,921	3.62	3.16	807	258	70
Neot Golan	N.G. Society	12,042	12,001	3.66	3.09	809	284	102
Beit Lechem HaGelilit	Dominsky Farm	11,942	12,037	3.63	3.04	802	222	55
Kefar Ha'roeh	Peleg Farm	11,824	11,783	3.54	3.13	785	127	85
Givat Yoav	Aloni Farm	11,821	11,616	3.71	3.14	795	177	61
Be'er Tuvia	Botzlin Farm	11,798	11,904	3.53	3.08	785	147	92
Kefar Yehezkel	Gilboa Farm	11,769	11,575	3.72	3.13	792	202	115
Be'erotaim	Weiss Farm	11,756	11,569	3.55	3.19	779	187	75
Givat Yoav	Gat Farm	11,641	11,492	3.63	3.15	778	135	43
Be'er Tuvia	Tzur Farm	11,640	11,793	3.44	3.09	769	221	271
Givat Yoav	Aharonov Farm	11,627	11,419	3.72	3.14	782	130	49
Kefar Yehoshua	Halevi Farm	11,588	11,052	3.89	3.23	785	269	59
Neot Golan	Cohen Farm	11,531	11,508	3.59	3.11	770	151	45

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Table 3.5

20 cows with highest adjusted ECM yield in 2004

Herd	Cow No.	Sire	Lact. No.	ECM kg	Milk kg	Fat %	Protein %
Ran Society	5006	Scorer	4	17,031	16,095	3.92	3.26
Carmiya	5071	Scorer	4	16,661	16,128	3.55	3.27
HaBonim	5006	Scorer	4	16,649	15,312	4.10	3.33
Tzevaiym Farm	851	Tapi	4	16,568	16,490	3.26	3.24
Ramat HaKovesh	5168	Scorer	5	16,378	17,030	3.52	2.93
Guivat Haiym Ichud	1631	Royal	3	16,344	15,059	4.22	3.27
HaBonim	4256	Scorer	5	16,313	15,966	3.50	3.23
Carmiya	5724	Moed	2	16,286	15,115	3.84	3.38
Ramat HaShofet	3384	Sinbad	6	16,200	16,749	3.30	3.04
Yavne	1470	Boiler	4	16,176	16,658	3.46	3.00
Pelech	228	Goopy	3	16,169	18,149	3.24	2.69
Pelech	424	Sedek	1	16,133	17,848	3.25	2.74
Hof HaSharon	25073	Romi	2	16,092	15,764	3.95	3.06
Yavne	1376	Shenef	4	15,958	14,383	3.92	3.51
Hof HaSharon	19190	Royal	4	15,938	14,121	4.55	3.36
Kefar Giladi	6131	Extreme	1	15,926	15,660	3.97	3.03
Tze'elim	4398	Ravmag	4	15,923	14,872	4.21	3.21
Ben Yosef Farm	93	Ronen	2	15,851	14,974	3.96	3.24
Carmiya	5329	Goopy	4	15,837	15,706	3.76	3.07
Nirim	4005	Goopy	2	15,837	15,033	3.88	3.25

Herd	Cow No.	Sire	Lact. No.	Days in milk	Milk kg	Average milk yield kg/day	Fat %	Protein %	Culling date
Tze'elim	2798	Duran	12	4,971	173,428	34.9	3.51	2.88	
Ma'ale Gilboa	6492	Lasso	11	3,964	165,419	41.7	3.22	2.88	
Tze'elim	3523	Pitzpon	7	3,441	150,341	43.7	2.99	2.89	
Reshafim	3128	Boteach	10	3,925	148,778	37.9	3.45	2.99	
Palmachim	2970	Sharash	11	3,864	145,425	37.6	3.14	3.22	27/10/04
Givat HaShelosha	3284	Boteach	9	3,607	144,629	40.1	3.43	2.73	
Mishmar HaNegev	3415	Sharash	11	3,628	144,576	39.9	3.32	3.08	05/09/04
HaKhotrim	4909	Lime	10	3,697	144,092	39.0	3.01	3.03	09/01/05
Mashavei Sadeh	6356	Galgal	9	3,201	142,607	44.6	2.75	2.66	
Afikim	5634	Shato	11	3,452	141,452	41.0	2.90	2.87	05/01/05
Hof HaSharon	15975	Boteach	12	3,435	140,488	40.9	3.59	2.88	
Ramat HaShofet	2900	Geshem	12	3,428	139,867	40.8	3.03	2.89	12/03/04
Tuval	201	Poshet	11	3,543	138,798	39.2	2.71	2.85	
Ein HaKhoresh	9532	Boteach	11	3,692	138,468	37.5	3.24	3.16	15/11/04
Fodor Farm	73	Mefi	9	3,527	136,647	38.7	3.31	3.10	
Nachal Oz	3010	Poshet	13	3,737	135,210	36.2	3.86	2.98	20/04/04
Givat HaShelosha	3405	Ginat	9	3,141	134,875	42.9	3.61	2.95	
Maoz Haiym	4616	Ginat	10	3,123	134,794	43.2	3.33	2.83	
Nordiya	2888	Boteach	10	3,084	134,743	43.7	3.03	2.99	
A.A.P. Society	288	Mefi	7	3,310	134,399	40.6	2.76	2.72	13/01/05

Table 3.6

20 cows with highest lifetime yield, producing in 2004

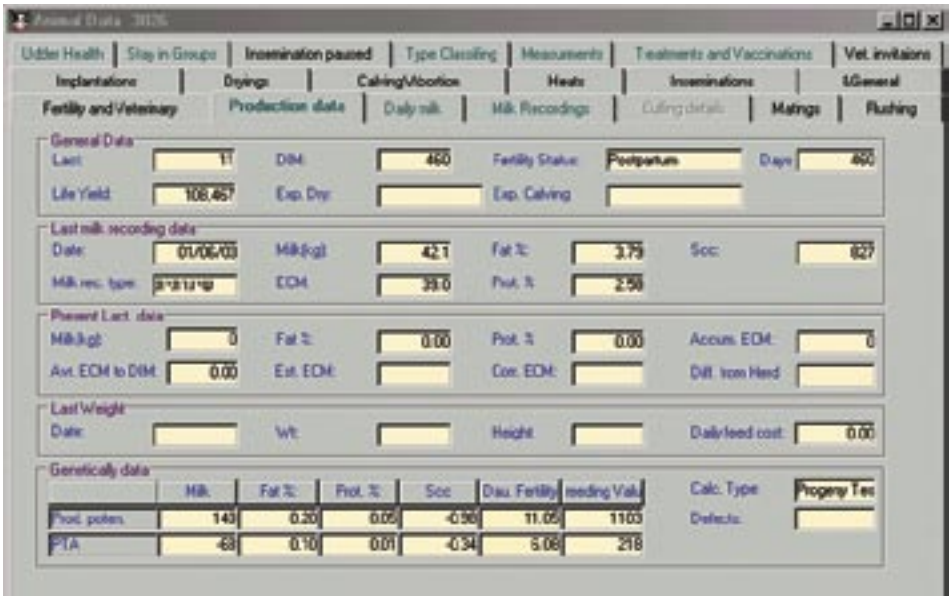
NOA – The Israeli Dairy Herd Management Program

Boaz Hanochi____ICBA, Product Manager of NOA Software

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 up-dated 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.



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, nearly 500 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 and the total number of cows which are managed under **NOA** software in Israel is nearly 70,000.

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____ICBA, Herdbook Manager / Joel I. Weller____A.R.O. – Institute of Animal Sciences – Dept. of Genetics, Genetist

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.

PD04 – THE ISRAELI BREEDING 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 3.50% Fat and 3.13% 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 coefficients for Daughters' Fertility and for Productive Longevity was computed to account for the economic value of those traits relative to milk production. The current Index PD04 was updated in December 2004 and is as follows:

PD04 = 6.3 (kg Fat) + 25.4 (kg Protein) – 300 (SCS) + 26 (Daughters' Fertility) + 0.6 (Productive Longevity)

Expected genetic gains after ten years of selection using this Index are: 561 kg Milk, 19.1 kg Fat, 18.3 kg Protein, 0.01% Fat and 0.01% Protein, - 0.08 SCS and 1.5 for Daughters' Fertility and 97 days for Productive Longevity.

Genetic evaluations for Milk, Fat and Protein production, SCS, Daughters' Fertility and Productive Longevity are calculated by the multitrait animal model, using parities 1 to 5, with each parity considered as a separate trait. The base for all genetic evaluations is the mean breeding value for cows born in 2000.

The Israeli Breeding Program

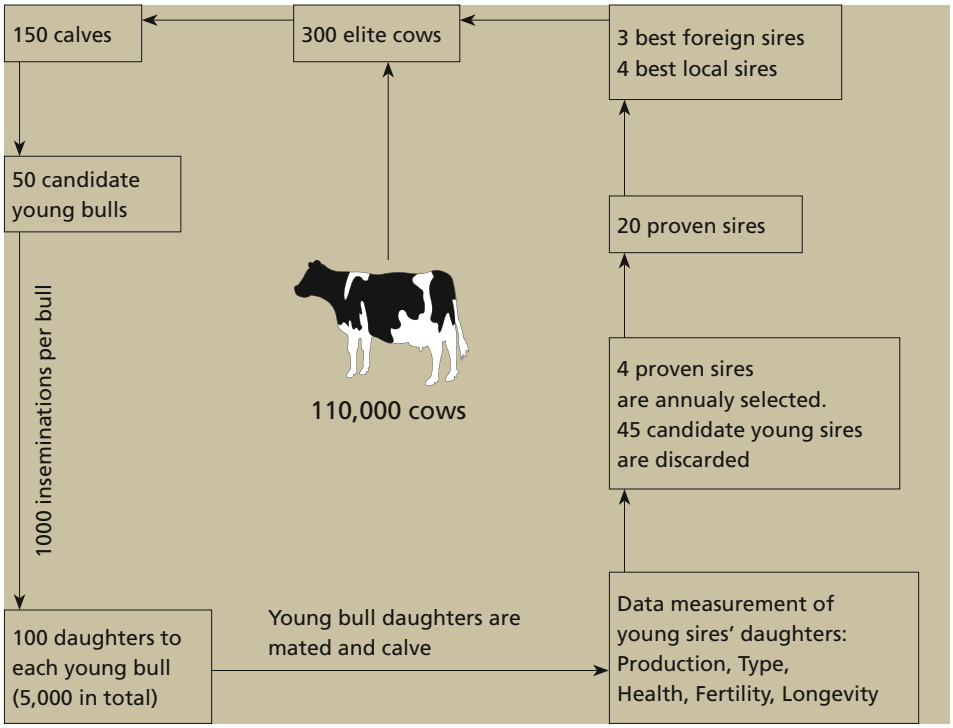
Yoel Zeron____Sion A.I. company, Director of Science and Production

The Sion A.I. company was founded in 2001 by the merging of On and Hasherut A.I. cooperatives. "Sion" currently keeps 240 bulls located in three different sites. Approximately 50 young bulls are tested every year. Semen from approximately 20 proven 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 performed bi-annually. Bulls and cows are ranked by the Israeli Selection Index PD04.

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 cows are involved 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

➤ **Diagram of the Israeli Breeding Program**



first enters the details of the proposed mating. The proposal is rejected if inbreeding coefficient is greater than 3.125% (calculated for 3 generations).

The bulls are housed at three different sites: Young bulls are located in two locations in the north of Israel, active and waiting bulls are kept at the central A.I. 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, or 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 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 18 months, 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 stutus 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 sub optimal 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, longevity 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).

Birth year	Milk kg	Fat kg	Fat %	Protein kg	Protein %	Daughters' Fertility	Productive Longevity	PD04
1985	-813	-36.8	-0.08	-37.2	-0.12	0.44	-277	-1304
1986	-676	-34.0	-0.10	-34.0	-0.12	-0.23	-250	-1235
1987	-616	-34.0	-0.12	-32.5	-0.13	-0.79	-235	-1215
1988	-483	-33.3	-0.15	-30.3	-0.14	-0.70	-210	-1159
1989	-365	-31.8	-0.18	-28.0	-0.16	-0.69	-183	-1084
1990	-232	-28.6	-0.19	-26.6	-0.18	-0.69	-160	-1009
1991	-175	-23.5	-0.16	-22.7	-0.16	-0.42	-149	-873
1992	-99	-18.7	-0.14	-18.6	-0.14	0.04	-110	-712
1993	-71	-17.6	-0.14	-16.6	-0.13	-0.26	-107	-682
1994	-73	-16.2	-0.12	-13.8	-0.10	-0.71	-98	-600
1995	-113	-13.3	-0.08	-12.6	-0.08	-0.48	-89	-531
1996	-47	-11.1	-0.08	-9.5	-0.07	-0.20	-61	-395
1997	-32	-7.2	-0.05	-7.2	-0.06	0.25	-40	-274
1998	-26	-6.8	-0.05	-5.0	-0.04	0.88	-14	-174
1999	-14	-4.3	-0.03	-3.1	-0.02	0.50	-12	-103
2000	0	0.0	0.00	0.0	0.00	0.00	0	0
2001	39	2.8	0.02	2.0	0.01	-0.37	10	61
2002	92	5.5	0.02	3.4	0.01	0.23	17	123

Table 3.7

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

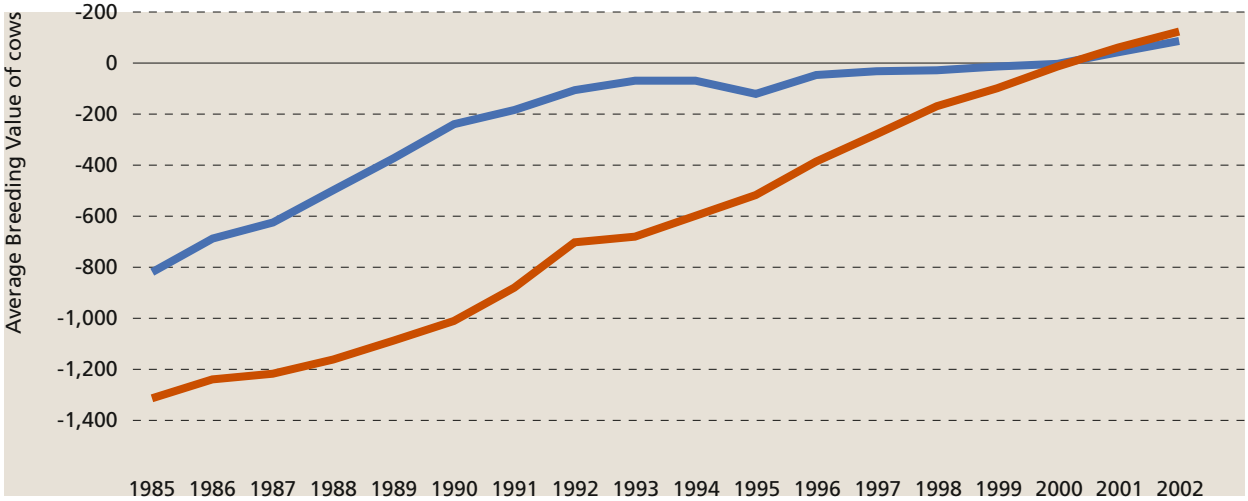


Fig. 3.2

Average Breeding Value of cows for PD04 and Milk, by birth year – Genetic Trends

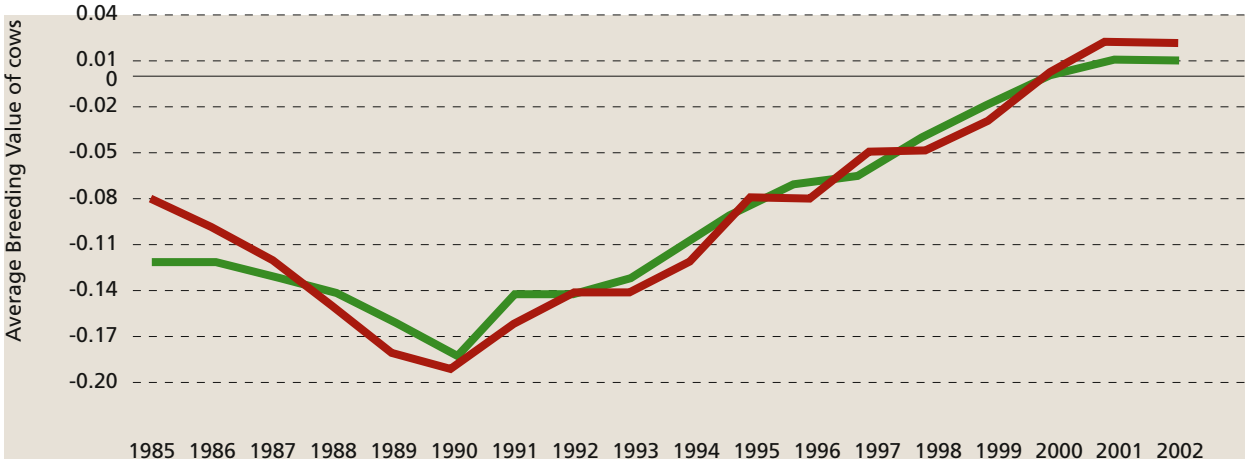


Fig. 3.3

Average Breeding Value of cows for Fat and Protein percentages, by birth year – Genetic Trends

Table 3.8

Average Breeding Value of bulls, by birth year

Birth year	Number of bulls	Milk kg	Fat kg	Fat %	Protein kg	Protein %	SCS	Daughters' Fertility	Productive Longevity	PD04
1981	32	-386	-21.3	-0.07	-18.5	-0.06	0.06	-0.10	-159	-721
1982	60	-410	-18.1	-0.03	-18.2	-0.05	0.07	-0.14	-176	-709
1983	19	-211	-14.9	-0.07	-15.5	-0.08	0.03	0.01	-107	-558
1984	39	-369	-17.3	-0.04	-18.5	-0.07	0.06	-0.32	-141	-689
1985	39	-364	-14.6	-0.02	-17.6	-0.06	0.08	-0.22	-145	-654
1986	31	-279	-14.1	-0.04	-15.4	-0.06	0.17	-0.41	-126	-616
1987	38	-235	-14.6	-0.06	-11.8	-0.04	0.17	-0.28	-112	-517
1988	49	-161	-10.6	-0.05	-11.2	-0.06	0.05	-0.63	-95	-441
1989	33	-91	-8.0	-0.04	-10.4	-0.07	0.05	-0.02	-80	-377
1990	31	-140	-9.2	-0.04	-11.0	-0.06	0.06	0.47	-98	-400
1991	41	-7	-7.0	-0.06	-4.9	-0.04	0.15	-0.20	-69	-260
1992	41	-165	-5.2	0.01	-5.8	-0.01	0.14	-0.73	-76	-285
1993	53	-203	-8.0	-0.01	-7.4	-0.01	0.13	-0.03	-56	-311
1994	47	-107	-5.6	-0.02	-4.2	-0.01	0.09	-1.11	-65	-235
1995	38	-37	3.0	0.04	-0.3	0.01	0.09	-0.73	-46	-63
1996	53	-148	-1.0	0.04	-2.4	0.02	0.13	-1.03	-55	-165
1997	31	-113	2.5	0.06	0.9	0.04	-0.02	0.18	-20	38
1998	58	21	6.5	0.06	4.9	0.04	0.05	-1.15	-10	113
1999	22	-6	2.8	0.03	2.3	0.02	0.03	-0.27	-20	50

➤

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	195,245
2132	Gaby	Arlinda Jet Stream	181,527
783	Pirchach	Hason	160,375
3212	Sinbad	Sunran Sundacer	145,711
3651	Avsha	Sea-Mist Bell Extra	143,143
2124	Shoeg	Shofet	128,094
787	Amir	Icar	119,631
3258	Shenef	Pony	115,988
2357	Flor	E-Z-Acres Starlite Bachelor	114,112
3241	Teva	Kingstead Valint Tab	111,922
3089	Pitspon	Gyus	111,131
3123	Tamim	Crescent Mead Chief Stewart	110,645
3080	Pirate	Sabal	110,058
2122	Shats	Shofet	110,046
3304	Goopi	Goliat	108,767
2176	Genosar	Gyus	103,848
2278	Mefi	Marshfield Elevation Tony	98,673
930	Amit	Senator	95,782
3070	Boteach	Pirchach	93,140
651	Yaniv	Paclamar Astronaut	91,741

SUFON 3811

Genetic Evaluation:
January '05
Genetic Base line:
Cows born 2000

Born: 29/10/97
Owner: SION A.I.

Sire: Scorer
Dam: Chezi
Dam Sire: Pitzpon

Records: 112
DIM: 367

Daus: 49
Herds: 32

Production Traits

Rel.	Milk kg	PD04	Fat kg	Fat %	Prot. kg	Prot. %	SCS
85%	140	703	11.4	0.06	11.2	0.06	-0.48

Functional Traits

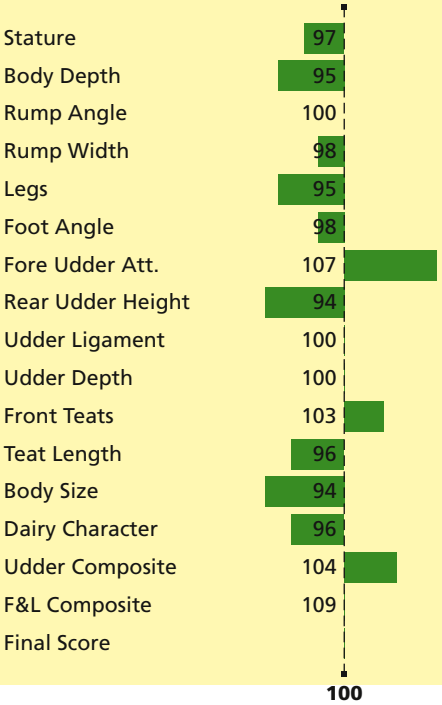
Calv. Diff.	Rel.	Daus. Fertility	Rel.	Longevity (days)	Rel.
1.7	94%	3.8	72%	173	67%

Average Daughter performance (305d)

Milk kg	Fat %/kg	Protein %/kg	ECM
11,239	3.49	3.19	11,932

Type traits

Rel. 59% Daus: 27



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.

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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
2004	65.9	43.0	35.6

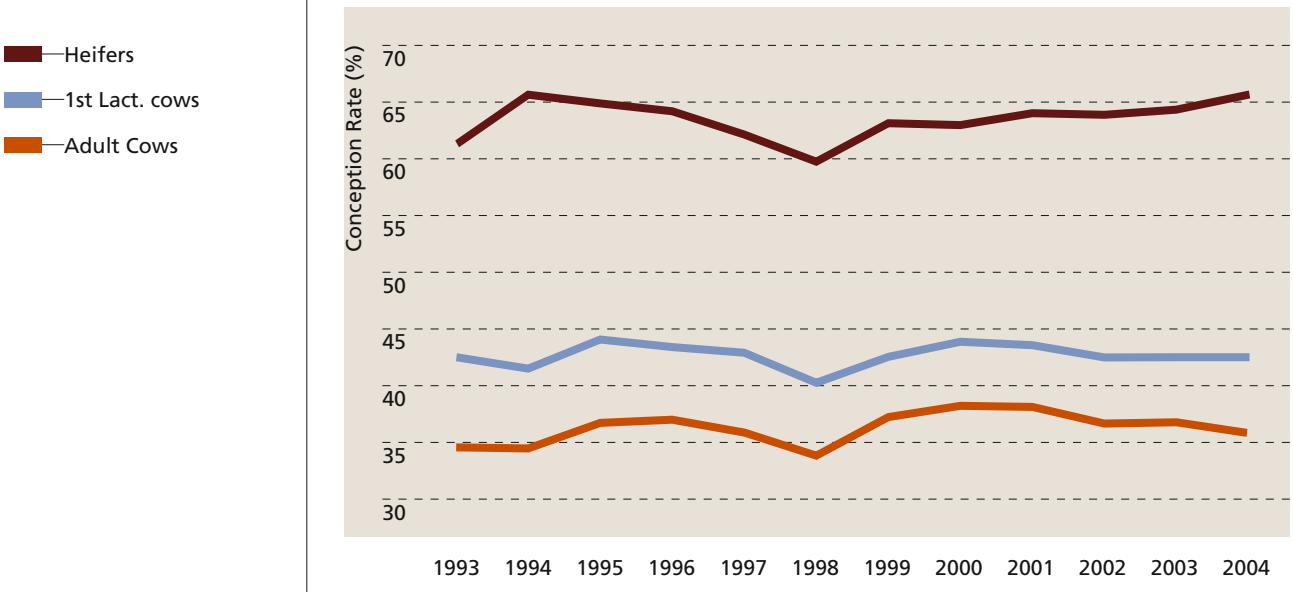

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Table 3.11

Fertility summary for Heifers, all herds (period: 11/03-10/04)

Number of heifers and Conception Rate, by age at 1st service			
	N	**% of total**	**C.R.(%)**
< 13 months		22.7	65.3
14-15 months		62.6	66.5
16-17 months		11.8	64.0
18-23 months		2.9	63.2
Total		100	65.9

Number of heifers and Conception Rate, by insemination number			
	N	**% of total**	**C.R.(%)**
First inseminations	34,011		65.9
Second inseminations	11,617		57.2
Third inseminations	4,764		50.8
Fourth + more inseminations	3,908		35.3
Total of inseminations	54,300		60.5

Heat detection			
Distribution of cycles' length (days):			
5 - 17	714	4.6	
18 - 15	9,058	62.5	
16 - 35	935	10.4	
36 - 60	3,898	22.5	
Total of natural cycles	14,605	88.8	
Induced cycles	1,848	11.2	
Average days between inseminations	28		
Rejections by inseminator		18.1	
Preg.checks with negative results		10.5	

Distribution of heifers by age at pregnancy onset			
<13 months	5,273	16.2	
14-15 months	18,172	56.0	
16-17 months	6,334	19.5	
18-19 months	2,015	6.2	
20-21 months	666	2.1	
Average age at effective insem. (mo)	15.4		

➤

Table 3.12

Fertility summary for first-calvers, all herds (period: 11/03-10/04)

Number of first-calvers and Conception Rate, by days post-partum at 1st service			
	N	**% of total**	**C.R.(%)**
< 70 days		6.2	40.6
71 - 100 days		48.7	44.3
101 - 130 days		37.2	43.9
131 - 150 days		7.9	39.3
Total		100	43.0

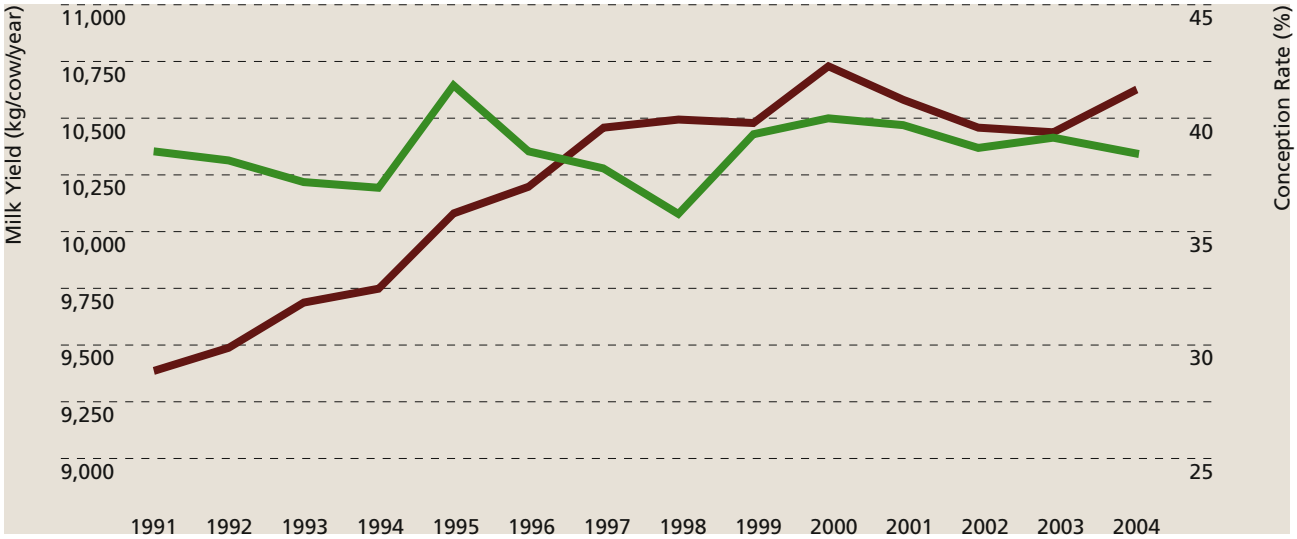
Number of first-calvers and Conception Rate, by insemination number			
	N	**% of total**	**C.R.(%)**
First inseminations	29,715		43.0
Second inseminations	16,918		37.3
Third inseminations	10,316		33.8
Fourth + more inseminations	16,513		28.0
Total of inseminations	73,462		37.0

Heat detection			
Distribution of cycles' length (days):			
5 - 17	1,519	4.6	
18 - 15	20,420	62.5	
16 - 35	3,402	10.4	
36 - 60	7,351	22.5	
Total of natural cycles	32,692	91.2	
Induced cycles	3,172	8.8	
Average days between inseminations	27		
Rejections by inseminator		14.0	
Preg.checks with negative results		21.7	

Distribution of first-calvers, by days post-partum at effective insemination			
< 75 days	1,210	4.9	
76 - 110 days	8,829	35.6	
111 - 150 days	7,310	29.5	
151-180 days	3,055	12.3	
181-270 days	4,389	17.7	
Average Open days	134		

Fig. 3.5

Average Milk Yield and Conception Rate at 1st service, for adult cows, between 1991 – 2004



The main fertility management goal for the farmer, is to have cows and heifers conceiving at the time the farmer intends them to, so that calvings will occur according to a projected production schedule.

Many studies in recent years have warned against the association between increasing levels of milk production and low fertility performance.

Fig. 3.5 shows that between 1991 and 2004 the Israeli cow has raised its average milk production by 1,200 kgs, without further deterioration of fertility performance, as evaluated by Pregnancy Rate at 1st service. This value has remained quite constant (38.4%) during those years. The lowest value (35.9%, in 1998) was the result of a very hot summer season, which significantly affected Pregnancy Rate.

➤

Table 3.13

Fertility summary for adult cows, all herds (period: 11/03-10/04)

Number of Cows and Conception Rate, by days post-partum at 1st service			
	N	**% of total**	**C.R.(%)**
< 50 days		0.6	24.9
51 - 80 days		29.1	34.4
81 - 110 days		50.4	36.7
111 - 150 days		19.9	35.6
Total		100	35.6

Number of Cows and Conception Rate, by insemination number			
	N	**% of total**	**C.R.(%)**
First inseminations	53,917		35.6
Second inseminations	33,687		34.4
Third inseminations	20,978		32.1
Fourth + more inseminations	31,200		26.1
Total of inseminations	139,782		32.7

Heat detection			
Distribution of cycles' length (days):			
5 - 17	4,332	6.1	
18 - 15	37,498	52.8	
16 - 35	8,102	11.4	
36 - 60	14,110	19.9	
Total of natural cycles	64,042	90.1	
Induced cycles	6,999	9.9	
Average days between inseminations	28		
Rejections by inseminator		10.8	
Preg.checks with negative results		25.6	

Distribution of first-calvers, by days post-partum at effective insemination			
< 75 days	3,485	8.3	
76 - 110 days	14,127	33.8	
111 - 150 days	11,711	28.0	
151-180 days	5,248	12.5	
181-270 days	7,213	17.2	
Average Open days	131		

Hahaklait Veterinary Services

Our Beginning

Hahakalit 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 it's 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, Hahakalit is still a strong and thriving unique organization both in size and philosophy, in the veterinary world. Hahakalit is 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, Hahakalit 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.

Hahaklait

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