

Report
Progressive Dairy Operators Study Tour to Israel

November 18 to 29, 2011

Introduction

The Progressive Dairy Operators of Ontario organized a tour to Israel to study the Israeli dairy industry from November 18th to 28th, 2011. The group consisted of 33 participants including dairy producers, veterinarians, a dairy nutritionist, a dairy equipment supplier and a government dairy advisor.



The group visited 6 dairy operations, two dairy technology companies, a milk processing plant, and a centralized feed centre. As well the group learned about the Israeli dairy industry by visiting with and hearing presentations by the Israel Cattle Breeders Association. The group also met with representatives from Hachaklait the centralized veterinary service in Israel. An olive oil processing plant was also visited, and other agricultural operations were discussed as we viewed them from our bus window.

Israel has the highest average milk production in the world: 11,991 kg in 2010, compared to the 2010 Ontario average of 8,548 kg. The purpose of the study tour was to learn what factors contributed to this exceptional milk production.

Israel is a land rich in history and culture. The group also visited a number of sites of historical and cultural significance while in Israel.

Summary of the Israeli Dairy Industry

General

Dairy and beef herds in Israel account for about 16.5 % of Israel's total agricultural production, 11.6 % of it is milk and dairy products and 4.9 % beef products. This sector supplies the country's total dairy requirements, with production potential reaching far beyond domestic needs. Production is regulated by a strict policy of planning and quotas

Israel's dairy industry faced the challenge of meeting the demands of a country whose population increased 10-fold in a relatively short period of time. Average milk production / yield per cow have increased about three times since the 1950s from 3.900 liters annually to almost 11.000 kg. (29,470 pound) per dairy cow.

The total dairy herd in Israel has about 110.000 cows, out of which some 95.000 cows are registered in the Israeli herd book.

Production Quota

Dairy farming in Israel is subject to production quotas. The quotas are set by the Israel Dairy Board (Production and Marketing) and prices have been controlled until recently by the government.

According to law, no dairy farm may produce and or market unprocessed milk. This process helps to balance supply and demand in the sector while allowing for continued growth and reasonable profitability.

Every three month, a target price is calculated based on the changing inputs / outputs of the milk production on the national level.

Structure

There are two farming systems in Israel (Table 1):

The Kibbutz (collective farms), averaging 350 cows per herd (200 -900), where the cows are milked three times daily. There are about 215 Kibbutz herds.

The Moshav (family herds in cooperative settlements), averaging 60 cows/herd (20 -150) where the cows are milked twice daily. There are about 680 Moshav type herds in the Herdbook and 750 smaller non registered dairy farms.

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

	2003	2004	2005	2006	2007	2008	2009	2010
Family farms (Moshav)								
Number	921	880	855	843	830	811	787	773
Average quota (x 1,000 ltrs.)	524	541	560	564	589	625	651	673
Cooperative farms (Kibbutz)								
Number	196	187	176	167	165	165	167	163
Average quota (x 1,000 ltrs.)	3,344	3,524	3,747	3,851	4,030	4,198	4,160	4,408
Agric. school farms								
Number	16	16	16	15	15	15	15	15
Average quota (x 1,000 ltrs.)	719	733	746	784	811	853	879	865
Total								
Number of farms	1,133	1,083	1,047	1,025	1,010	991	969	951
Average quota (x 1,000 ltrs.)	1,015	1,059	1,098	1,102	1,155	1,223	1,259	1,316

Breeding

In Israel there is only one dairy breed, the Israeli Holstein (Figure 1), which was developed from the early thirties on by out-crossing local & Damascus cows with Friesian bulls and later with Holsteins.

Today, the last trace of the Damascus cow has disappeared and after 60 years of breeding in a hot climate, the Israeli Holstein cows have adapted to the environment.



Figure 1 Israeli Holstein Cow

In Israel, for more than four decades now, 100 % of the dairy population, cows and heifers, have been bred exclusively by artificial insemination, carried out by two A.I. Centers, which operate a common national breeding program and ET unit.

Breeding takes into account the milk-yield and the improvement of the protein & fat composition. This data undergoes statistical analysis which results in the selection of desirable traits. These traits are then cross-bred to produce superior offspring.

Feeding

Israel has almost no grazing land and therefore most of the herd's nutrition is based on a concentrated total mixed feed ration (T.M.R.). The feed is generally prepared in a central regional station serving all the herds in the area, rather than prepared separately by each herd-owner.

Israel's dairy herds utilize computerized feeding systems to determine the correct balance for a milk-yielding or dry cow during the gestation period, or to develop a suitable diet for young calves. The feed ration is calculated for optimal nutrition and economic efficiency.

In order to facilitate feeding, a special mobile unit (unified wagon) has been developed which mixes feed and distributes it among the dairy farms. The on-board computer controls the whole process and data is transmitted to the central computer.

Technologies

Israel's dairy industry employs domestically developed advanced technologies -technologies that have changed the industry through automation, bringing it under strict quality control. This eases the burden on human resources and ensures operations that meet prescribed standards and that reach high profitability

Milking systems include recording of milk yield, duration of milking, detection of udder infections, etc., whereas the pedometers record data regarding the estrus cycle of the cow.

Introduction to the Dairy Industry in Israel

Hachaklait Veterinary Services and the Israel Cattle Breeders Association

HACHAKLAIT Veterinary Services

www.icba-israel.com/icba-haklait.html

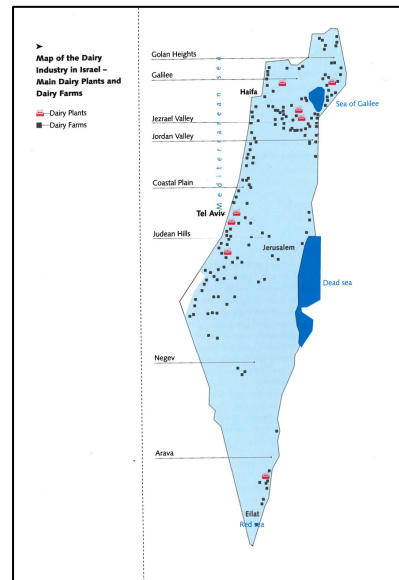
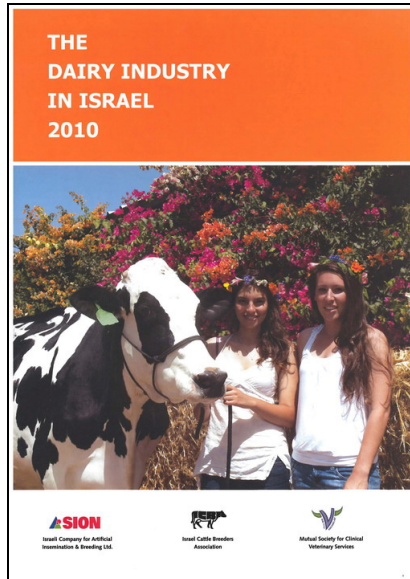
38900 Caesaria Industrial Park, P.O.B. 3039

el: 972-4-6279600

The first agricultural stop of the study tour was to the joint headquarters of the Hachaklait Veterinary Services and the Israel Cattle Breeders Association. Here the group had a tour of the Hachaklait lab facilities and veterinary supply depot. Three presentations were then made to the group on the following topics:

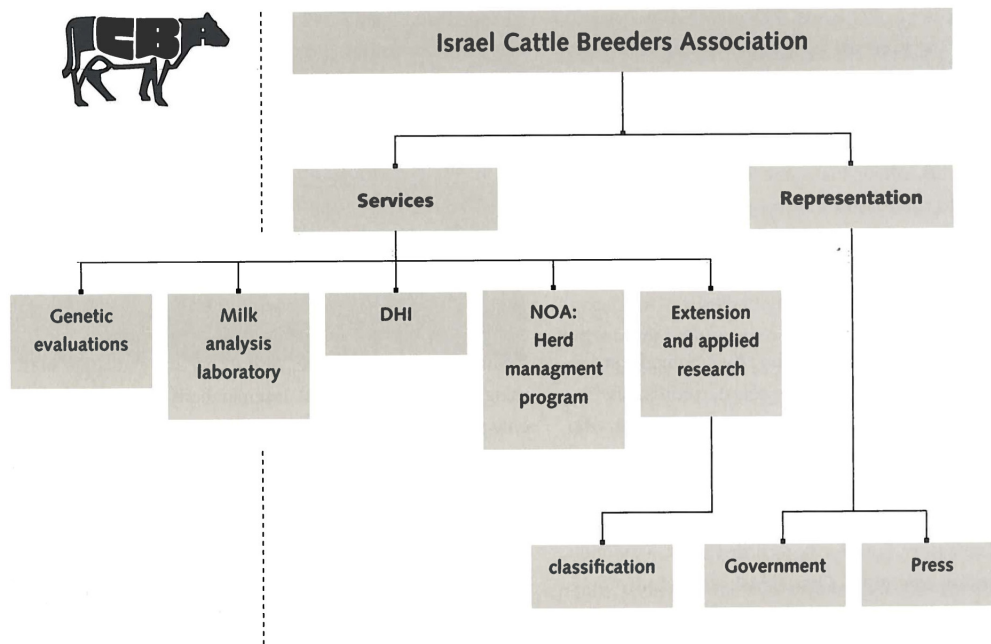
- The Dairy Sector in Israel
- Improvement in Milk Quality in the Last Decade
- Hachaklait Veterinary Service

These topics provided an excellent introduction to the dairy industry in Israel. The group was given a copy of "The Dairy Industry in Israel 2010". This publication provided an excellent summary of dairy industry statistics and challenges faced by Israeli dairy producers. It also described the Israeli Herdbook which is published by the Israel Cattle Breeders Association. The Israel Herd Book is a computerized data bank allowing its users to trace genealogy, milk yield and quality of each cow, as well its production history, fertility, state of health, and any other useful data for maintaining / developing the standards of the dairy industry.



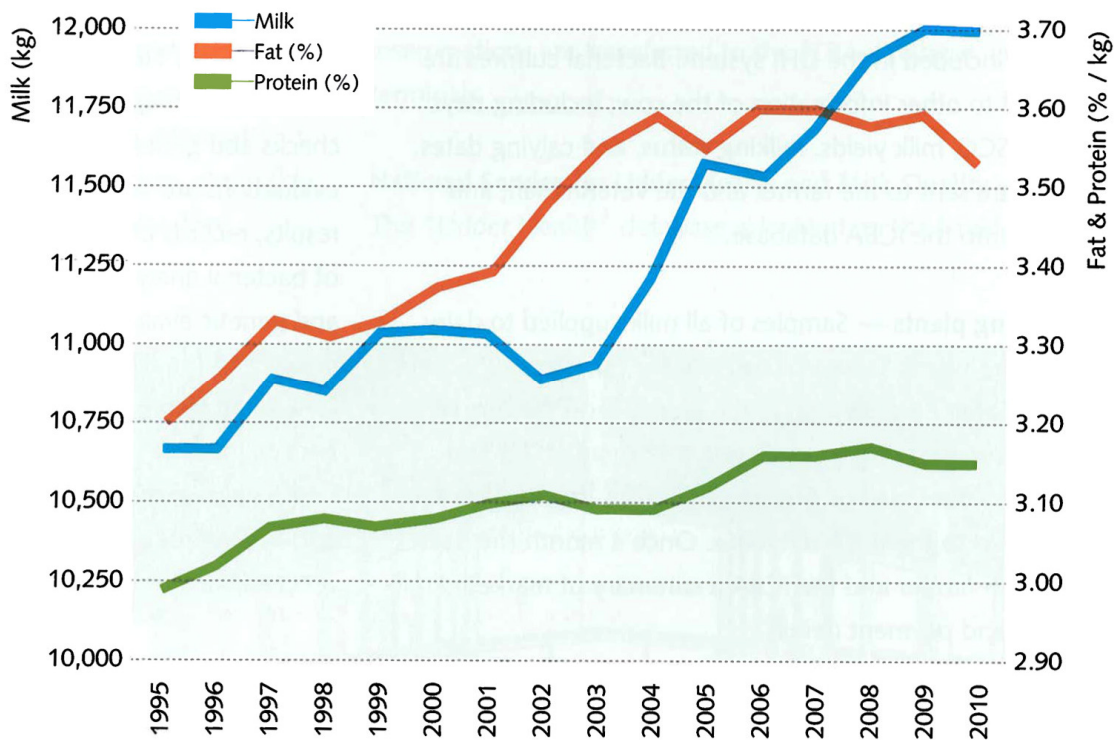
The Israel Cattle Breeders Association

Yossi MalulPublishing Department Editor, ICBA [hmb-malul@icba.org.il]



Production Averages – 305 day adjusted lactations (1-5)

Calving year	No. of cows	Milk, kg	Fat, %	Protein, %	Fat (Kg)	Protein (Kg)
1995	84,459	10,664	3.20	2.99	341	319
1996	82,195	10,663	3.26	3.02	348	322
1997	82,117	10,885	3.33	3.07	362	334
1998	82,672	10,835	3.31	3.08	359	334
1999	83,691	10,929	3.32	3.07	363	336
2000	81,820	11,048	3.37	3.08	372	340
2001	86,152	10,945	3.41	3.10	373	339
2002	86,496	10,887	3.48	3.11	379	339
2003	84,698	10,935	3.55	3.09	388	338
2004	84,069	11,230	3.59	3.09	403	347
2005	82,916	11,567	3.55	3.12	411	361
2006	80,137	11,574	3.6	3.16	417	366
2007	82,683	11,794	3.6	3.16	425	373
2008	87,419	11,939	3.58	3.17	427	378
2009	83,581	12,033	3.59	3.15	432	379
2010	86,234	11,991	3.53	3.15	423	378



20 cooperative herds with highest average annual milk yield per cow (3x milkings) in 2010

No.	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
1	Sa'ad	14,503	14,402	3.48	3.28	973	180	294
2	Carmiya	13,605	13,332	3.68	3.25	923	219	367
3	Nachal Oz	13,590	13,563	3.59	3.19	919	136	304
4	Alumim	13,497	13,290	3.70	3.21	918	189	314
5	Shutfut Ran	13,362	13,418	3.59	3.16	905	143	937
6	Gevim	13,356	13,511	3.41	3.22	894	173	286
7	Ginosar	13,257	13,219	3.68	3.15	902	212	245
8	Yavneh	13,253	13,066	3.66	3.22	899	128	373
9	Habonim	13,232	13,230	3.59	3.18	895	177	236
10	Givat Hayim Ihud	13,136	12,592	3.80	3.32	895	173	320
11	Tze'elim	13,093	12,697	3.77	3.26	892	171	267
12	Urim	13,068	13,126	3.58	3.16	884	115	309
13	Refet Galil Ma'aravi	13,048	13,151	3.51	3.19	879	176	785
14	Maccabi-Hanaton	13,044	13,043	3.61	3.17	884	184	502
15	Hof HaSharon	13,013	13,020	3.60	3.18	881	182	891
16	Be'erot Itzhak	12,975	13,060	3.61	3.13	880	125	247
17	Mefalsim	12,966	12,987	3.52	3.21	873	176	299
18	Be'Rishtenu	12,962	13,294	3.43	3.13	871	207	306
19	Migdal Oz	12,949	13,136	3.50	3.15	873	141	239
20	Shedamot (Dorot)	12,947	13,140	3.47	3.16	871	245	489

20 Family herds with highest average annual milk yield per cow (2x + 3x milkings) in 2010

No.	Village	Herd	ECM kg	Milk kg	Fat %	Protein %	F+P kg	SCC x1000	No. of cows in herd
1	Merhavia	Nowitz Farm	13,688	13,874	3.65	3.08	932	115	59
2	Ha'Shechafim Farm	Ha'Shechafim Farm	13,644	13,554	3.51	3.27	917	248	168
3	Amatz	Scorsaro Farm	13,590	13,385	3.63	3.24	920	153	90
4	Givat Yo'av	Efrat Farm	13,366	13,609	3.57	3.09	906	59	45
5	Amatz	Sahar Farm	13,324	12,982	3.68	3.28	903	244	70
6	Be'er Tuvia	Tzur Farm	13,290	12,940	3.75	3.25	905	242	363
7	Ramat Tzvi	Goldenberg Farm	13,166	13,360	3.56	3.11	891	111	49
8	Kefar HaYarok	Kefar HaYarok	13,150	13,492	3.58	3.04	893	155	70
9	Hayogev	Koren Farm	13,128	12,419	3.86	3.36	896	260	58
10	Givat Yo'av	Sofer Farm	13,085	13,020	3.71	3.14	892	146	46
11	Shfeyia Ag. School	Shfeyia Ag. School	13,078	13,068	3.66	3.15	889	136	78
12	Beit Shearim	Marmor Farm	12,972	12,376	3.75	3.38	880	206	56
13	Sde Ya'akov	Baranawski Farm	12,949	13,020	3.58	3.16	876	198	146
14	Ramat Tzvi	Landau Farm	12,933	13,163	3.58	3.09	877	167	65
15	Avnei Eitan	Nissan Farm	12,912	12,617	3.82	3.19	884	183	82
16	Amatz	Israel Reuven Farm	12,906	12,427	3.83	3.27	882	275	88
17	Sharona	Segalchik Farm	12,889	12,901	3.76	3.09	882	73	44
18	Be'er Tuvia	Golan Farm	12,831	12,808	3.52	3.23	864	214	165
19	Givat Yo'av	Ben Yossef Farm	12,705	12,469	3.78	3.19	868	146	48
20	Givat Yo'av	Shani Farm	12,691	12,769	3.60	3.15	860	169	83

Centralized Veterinary Service – summarized by Dr. Rick Knill, Mitchell Veterinary Service Hachklait Veterinary Services originated in 1919 as cooperative owned by a group of dairy farmers whose motive was to combine a mutual insurance policy with comprehensive veterinary medicine. The motive was to protect valuable cattle which had been imported to a hot land, burdened with disease. Hachklait was owned and managed by the farmers for the benefit of farmers. Veterinarians are hired as contract employees of the cooperative.

Hachklait believes in intensive service at all levels: sick individual cows, herd health, prevention and control of infectious and production diseases, food safety and animal welfare. A vet is responsible for 11 herds that they visit 2 to 3 times per week. Hachklait provides veterinary services to 900 dairy farms with over 90,000 milking cows, which comprise more than 80% of the dairy cattle population in Israel.



Figure 2 Hachklait Vet at Mesilot Dairy farm

A routine farm visit involves examining each fresh cow within the first 3 days of lactation. A reproductive exam is done for retained placenta and uterine infection. Each fresh cow has her urine tested for ketosis and is body condition scored. Treatment recommendations are given to the herd manager to be followed. Cows are body condition scored again at peak milk production and dry off exam. Cows bred 6 weeks are examined by palpation for pregnancy (Figure 2). Cows not bred after 60 days in milk are examined for reproductive health problems. Cow activity heat detection systems are used to identify cows to be bred. Hormone treatments are administered by the vet.

Preventative health programs involve giving a modified live vaccine for BVD, IBR, PI3 and BRSV to each fresh cow prebreeding. Heifers receive 2 vaccinations of this vaccine before breeding also. The herd is vaccinated 4 times per year for Clostridial diseases. This is done as prevention for botulism which is a concern when purchasing complete TMR rations and the source of feed ingredients is uncertain. The government of Israel administers a state vaccination program for foot and mouth disease which is endemic here. All animals are vaccinated for foot and mouth disease every 6 months.

The National Service for Udder Health and Milk Quality is the lab service and field department of the Israeli Dairy Board. Bulk milk less than 220,000 SCC receives a premium quality grade and an economic incentive is paid to the producer. 70% of the milk produced in Israel is below the 220,000 SCC threshold. Cows are tested for Johnes twice yearly and some testing for bovine leukosis is also done using milk samples submitted for production record testing. The Israeli dairy herd is about 1% Johnes positive. This service also performs milk culture on mastitis samples submitted. Samples are collected by the milk truck drivers at the farm and brought to the lab. The predominant mastitis pathogens are the environmental bacteria such as E coli.

The Hachklait is able to document the health of the Israeli dairy herd well because it provides veterinary services to the majority of Israel's dairy cows. The herds in Israel have approximately

20% ketosis, 25% metritis, 1% displaced abomasums and less than 5% culling in the first 60 days in milk. There are no significant herd problems with infectious foot rot or Hairy Foot Warts diseases so foot baths are not routinely used. Herds practice twice yearly foot trimming. Dairy farms in Israel must be certified Kosher to produce milk for the predominant Jewish population of Israel. This involves regular inspections by a Rabbi. There are specific religious laws that must be followed for a herd to maintain its Kosher status. For example if a cow has a displaced abomasum and has surgery performed, the veterinarian cannot pierce the abomasum stomach with a surgical needle. This means that the only method for correcting abomasal displacement in Israel is to perform surgery on the right side of a standing cow and suturing omental fat associated with the abomasum. The abomasum itself is not sutured. A toggle procedure for correction of abomasal displacement is not practiced either. The surgical procedure is witnessed by the Rabbi. Fortunately, abomasal displacements are only about 1% incidence.

Another example of the challenge of dairy producers and cow health to maintain Kosher status of the herd is in producing milk for Passover. Passover is a very religious holiday for the Jewish faith. For 1 to 2 weeks before Passover, the TMR must have all wheat hay, straw and hay ingredients removed. This is the main source of the effective fibre in the TMR. What remains is some corn silage, corn and grains and byproduct feeds. The resulting TMR is high in grain and low in effective fibre which contributes to cow health problems such as ruminal acidosis and displaced abomasum. Dairy producers comply with the religious requirements to maintain their Kosher status.

The Israeli dairy industry is very progressive in delivering preventative cow health programs. The herds we visited had strong healthy cows in good body condition walking on sound feet and legs. A strong emphasis is given to cow comfort as seen with the preference for housing cows on a dry manure pack, and having large fans and significant water soaking systems to abate summer heat stress. The organization of veterinary services as a producer cooperative is unique and allows for consistency in the preventative programs and services between dairy farms.

Centralized Feed Services

Most Israeli dairy farms do not have enough of a land base to grow their own feed. Therefore they rely on centralized feed services to supply them with feed. In Israel there are feed mills and feed centres. Feed mills produce concentrate that is supplied to feed centres or directly to some dairy farms that have sufficient land base to grow their own forages. Feed centres produce a TMR and deliver it directly to dairy producers. While in Israel the group had the opportunity to visit the Zemach Feed Mill.

The Zemach Feed Mill (Figure 3) was founded in 1960 and is a cooperative association owned by 47 cooperative farmsteads from the Jordan Valley, the Beit She'an Valley and the Golan Heights. Zemach Feed Mill manufactures a variety of feeds, with 57% intended for poultry –



Figure 3 Zemach Feed Mill

broilers, turkey and egg-laying poultry – 25% intended for cattle, sheep and goats and 18% intended for the fish sector. Additionally, the company manufactures small amounts of pet food. The past twenty years have seen a general increase in productions: from 65 thousand tons to 240 thousand tons in 2008.

Zemach Feed mill is in daily contact with growers via its technical support staff, offering a unique feeding plan adapted to conditions in the field, and based on the quality of the feed and the maximum profit for the grower. Through trials held in testing stations and in the field, Zemach Feed mill is constantly renewing the composition and the shape of its feed. A sophisticated lab performs meticulous analyses, starting with the raw material coming into the factory and up to the final feed – upon dispatch to the grower.

Zemach Feed-Mill is one of Israel's best in the ruminant sector. The mill is owned by Beit Shean Valley, Jordan Valley and Golan Heights' farmsteads. Most farmsteads include dairy and/or beef cattle herds and flocks of sheep and goats for milking and fattening.

Milk Processing

The PDO group had the privilege of visiting the Alon Tavor Dairy processing plant (Figure 4) operated by TNUVA. The plant is ultramodern and one of the most advanced milk production plants in the world and the largest one in the Middle East. It specializes in the production of plastic cup milk products, soft and hard cheese, etc. The facility is located in the northern-central region on a 15 acre site.

Tnuva

Before the state of Israel was established, when the land was barren, there was a need to supply fresh products to the consumer. That's how Tnuva was founded in 1929. Tnuva was a cooperative of 620 agricultural settlements (kibbutz and moshav), which joined together to market mainly fresh milk. A few years later, Tnuva began marketing a variety of agricultural products: Dairy products, meat and poultry, fish, eggs, fruits and vegetables.

In the mid 30's there was a worldwide economic and political crisis. Tnuva was badly affected by the cheap imports from the British Empire. However, Tnuva overcame these obstacles and stood firm in preparation for Israel's war of independence. After the war and the declaration of independence in 1948, the young state of Israel experienced riots and tensions between Arabs and Jews.

Tnuva supplied food in the greatest times of need to the most isolated settlement. End of the 50's it was back to normal days. Tnuva's surplus of milk was directed towards the production of hard cheeses and butter. "Children of Tnuva" -This was the nickname of the children of the 50's and



Figure 4 Alon Tavor Milk Processing Plant

60's. It was known that the name Tnuva was synonymous with fresh agricultural products. In the 80's, the agricultural economy opens up to import and export, a competitive market which requires Tnuva to adjust itself to the consumer's demands.

TNUVA Co-Op for Marketing of Agricultural Produce in Israel Ltd. is Israel's largest food manufacturing and marketing company, specializing in food products such as milk and dairy products, eggs, poultry and meat, fish, frozen food products, etc. About 70% of Israel's annual milk production volume, which stands over 1.2 billion liters, is processed by TNUVA.

Comments by Rodger Harrop, dairy producer and a director of the Gay Lea Co-operative

- The processing we saw in Israel was state of the art. It was computer controlled stainless steel.
- It was all automated right to the monorail system that handled the pallets of the finished goods
- The pallets even had transponders so they were recognised in inventory.
- It was a plant that most North American companies would like to have.
- Labour was at a minimum
- They had 1.3 billion in sales. Products were Cottage cheese, soft fresh cheese, cream cheese pudding deserts, and yogurt. (In a partnership with Yoplait). It's all kosher (Inspected by a Rabbi and cannot work on Saturdays and holidays)
- The plant is HACCP certified and ISO 2001
- The milk coming in is tested for freezing point, antibiotics, taste and smell before unloading
- Being as cottage cheese was very popular they had a large automated system to produce and package. They made 100 vats a week with no reverse osmosis.
- They had 28 filling lines (for all products) all in plastic and 1 in cartons. The monorail system then took over and wrapped and warehoused the product(no forklifts). It was then sent to distribution centres in the north and south of the country
- There is no plant allocation system but they always have enough milk. They do their own product development and advertising
- Being a large cheese producer they have excess whey which they pump to another plant that produces lactate, milk protein concentrate and whey protein concentrate (mostly for sale to ice cream manufactures Nestle & Unilever)

Data Management Technology Companies

The PDO group had the privilege of meeting with the two leading technology companies in the management of milk recording, heat detection, and health prediction software and equipment. They are S.A.E. Affikim and SCR Engineers Ltd.

S.A.E. Affikim

S.A.E. Affikim

<http://afimilk.com/>

Kibbutz Afikim, (south end of Sea of Galilee)

ZIP Code:15148, Israel.

Tel General: +972-4-6754811

S.A.E. Afikim the company (or at its known name AfiMilk) develops, manufactures and markets computerized systems for managing dairy farms, sheep and goats (Figure 5). Afimilk, the flagship of all management systems, was introduced as the first system of its kind in the world 25 years ago. Since these days the Afi systems led the way as an important management tool worldwide.

Afikim, established in the 70's, is the world leader in automatic data collection and dairy management systems. The world's first

electronic milk meter was invented by the late Eli Peles, a kibbutz member, and the Afimilk system and product line grew from there. SAE Afikim today employs approximately 120 people, most of them are engineers, programmers, researchers and professional dairy experts.



Figure 5 Afikim Product Display



Figure 6 Data Management with Afimilk at Landau Dairy Farm

Afikim distributes Afimilk systems in over 50 countries worldwide and today, after more than 25 years of innovation, more than 120,000 milk meters and 1.5 million

I.D. tags and pedometers are used by thousands of customers.

S.A.E. Afikim's unique cooperation with academia, as well as with its customers, creates a fertile blend of new ideas. These ideas are brought to realization by a large R&D team, thus many

new and innovative ideas and concepts are introduced to the market.

The PDO group was able to tour the Afimilk plant at the Afikim Kibbutz and meet with product representatives and researchers. The group heard a special presentation by Dr. Obed Nir on dairy herd health and performance under the title of "Negative Energy Balance in Early Lactation". The group visited several dairy farms which made extensive use of the Afimilk technology (Figure 6).

SCR Engineers Ltd.

The second data technology company the PDO group met with was the SCR Engineers company.

SCR Engineers Ltd.

www.scrdairy.com/

6, Haomanut St.

Netanya, ISRAEL
Tel: 972-9-8652050
Fax: 972-9-8650703

The SCR company (Figure 7) provides a number of different management tools for monitoring milk production, cow health and heat detection such as:

DataFlow™ controls and monitors the milking parlor, automatically collects comprehensive data on individual cow status in the herd, processes the information presents it in real-time to intended recipients in a fully-customizable easy-to-understand reports and alerts, and enables the integration of optional farm automation modules.



Figure 7 The SCR Company

Heat Detection

Since its launch in 2004 SCR™'s heat detection technology became the industry standard of heat detection technology, it is sold worldwide, has been installed in over 2,500 farms with over 300,000 monitoring tags deployed.

SCR™'s heat detection technology monitors individual cows' activity levels and activity intensity 24 hours a day. Activity is monitored in two-hour blocks, providing highly detailed information on the cow's activity levels. Each time the cow passes under a transceiver ID unit the data is transmitted from the tag to the ID transceiver using reliable infrared communication.

Activity data is then analyzed by the terminal (Figure 8) using proprietary algorithms which separates cow's day to day activity from heat related activities.



Figure 8 Heat Detection Monitor

In addition to heat related activity detection, SCR™'s technology reports cows not displaying heat signs for 30 and 60 days and cows with low activity levels, features that provide herd managers with an efficient tool for the early detection of animals needing management attention

To provide additional labor saving benefits the system may be integrated with a variety of sorting gate options.

The H-Tag™

The H-tag™ is a unique cow motion sensor consisting of an acceleration sensor, microprocessor

and memory. The H-Tag™ records a general activity index which quantifies all animal movement and movement intensity (walking, running, laying, standing up, head movements etc) in two hour time blocks.

The H-Tag™ is attached to the upper part of the cow's neck with a strap. The H-Tag™'s position enables the recording of more characteristics of cow activity through its head movements. The strap and buckle are designed for convenient attachment and removal, enabling easy transfer of the tags among cows if needed

Rumination Monitoring

Rumination is a critical sign of a cow's wellbeing. Changes in rumination are the earliest signs that provide warning about potential problems. The earlier a farmer can obtain information about a potential health problem, the cheaper it will be to deal with the problem.

The PDO group spent a day on several dairies observing the SCR monitoring equipment in use and ended the day by touring the SCR plant and test facilities.

The Israeli Dairy Farm

The Israeli dairy farm is quite different from Ontario dairy farms. Mainly because of the climate, land base, and social structure. The hot dry climate (Table 2) allows for minimal housing, so the main structures on the dairy are the milking centre (Figure 9) and the cow shed (Figure 10). Israeli environmental regulations are similar to Ontario in that they require run-off control. At one time most Israeli dairies had open dry lots, but now all dairies have some form of roofed structure. Although the majority of the year is hot and dry. The season from November to March is the “rainy” season when Israel gets the majority of their yearly moisture and is cooler.

Table 2. Temperature Data for Israel

Cities:		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jerusalem	C	6-11C	7-14	8-16	12-21	15-25	17-27	19-29	19-29	18-28	16-26	12-19	8-14
	F	43-53	44-57	44-61	53-69	60-77	63-81	66-84	66-86	65-82	60-78	54-67	47-56
Tel Aviv, Netanya, Herzliya	C	9-18	9-19	10-20	12-22	17-25	19-28	21-30	22-30	20-31	15-28	12-25	9-19
	F	49-65	48-66	51-69	54-72	63-77	67-83	70-86	72-86	69-89	59-83	54-76	47-66
Haifa	C	8-17	9-18	8-21	13-26	15-25	18-28	20-30	21-30	20-30	16-27	13-23	9-18
	F	46-63	47-64	47-70	55-78	58-76	64-82	68-86	70-86	68-85	60-81	56-74	48-65
Tiberias	C	9-18	9-20	11-22	13-27	17-32	20-35	23-37	24-37	22-35	19-32	15-26	11-20
	F	48-65	49-67	51-72	56-80	62-89	68-95	73-98	75-99	71-95	65-89	59-78	53-68
Eilat	C	10-21	11-23	13-26	17-31	21-35	24-37	25-40	26-40	24-36	20-33	16-28	11-23
	F	49-70	51-73	56-79	63-87	69-95	75-99	77-103	79-104	75-98	69-92	61-83	51-74
Dead Sea	C	11-20	13-22	16-25	20-29	24-34	27-37	28-38	29-38	27-36	24-32	18-26	13-21
	F	53-68	56-72	61-78	68-85	75-93	80-99	83-102	83-101	81-96	75-90	65-80	56-71

All Israeli dairies milk three times per day so their parlours are built for efficiency and most make use of milk data collection and cow management technology from Afimilk or SCR. The style and type of parlour is very similar to parlours in Ontario (Figure 11).



Figure 9 Israeli Milking Centre



Figure 10 Israeli Cow Shed



Figure 11 Milking parlour



Figure 12 Cows on manure pack

The Israeli “Cow Shed”

Probably the biggest difference that the group observed was with the “cow shed” or Israeli dairy barn. The majority of dairy cows in Israel are housed on a manure pack (Figure 12). This sounds very unsanitary and from the sounds of it you would expect the cows to be a dirty mess, but they are very clean and comfortable. During the hot summer weather the manure pack would be very dry, dusty and almost like peat moss consistency. When the group saw it most where still solid and firm, but moist on top.

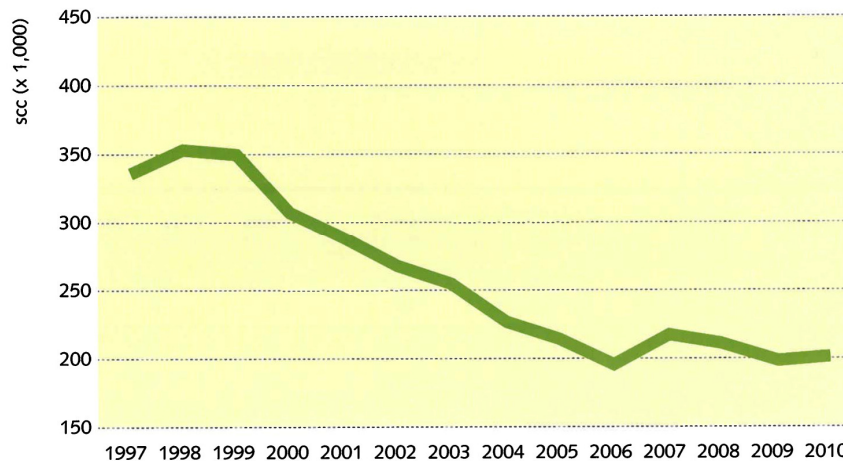
The manure pack is cultivated one to three times per day (Figure 13), not to aerate the pack like is done with compost bedding pack barns, but more to incorporate the manure. Bedding is never added unless there is a wet spot in the pack that needs to be dried out. The pack is allowed to build to a depth of about 3 to 4’ and is only cleaned out once every 4 to 6 years. With



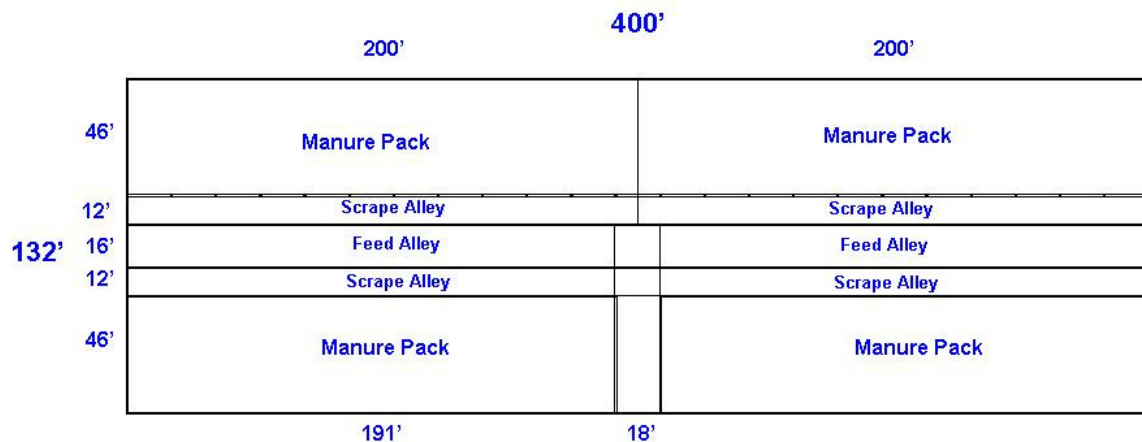
Figure 13 Manure pack is cultivated twice per day

this type of bedding system you might expect major mastitis problems, but the somatic cell count decreased steadily in Israel until it reached about 200,000 in 2006 and continues to hold around that level (Table 3).

Table 3. Average somatic cell count, by year



The manure pack is very comfortable. The group learned that cows were given 17 to 18 sq.m. of bedded pack or 185 to 192 sq. ft. About 50 cows were housed in a group over 200 ft. of barn length resulting in a space of 4 ft. per cow at the feed manger. Alley widths were 12 ft. similar to Ontario and large water troughs were located along the feed alley.



200 Cow Barn

20 – 22 sq.m. per cow including scrape alley (230 – 240 sq. ft.)

17 – 18 sq. m. per cow of manure pack (185 – 192 sq. ft.)

Figure 14 Floor plan of the Israeli cow shed

The cow shed was an all metal structure with a very low pitch roof (Figure 15). The roof itself was unique on most farms as it was retractable. At the time of year we visited the roof was open in the daytime to allow the sun to dry out the pack and it was closed at night. During the hot summer weather it would be closed in the daytime to provide shade and be open at night for cooling. It opened and closed very simply with a small electric motor and cable system. The roof peak was open. The side walls were about 20 ft. high without any covering. Fans were also used to dry the pack and to provide some cow cooling.

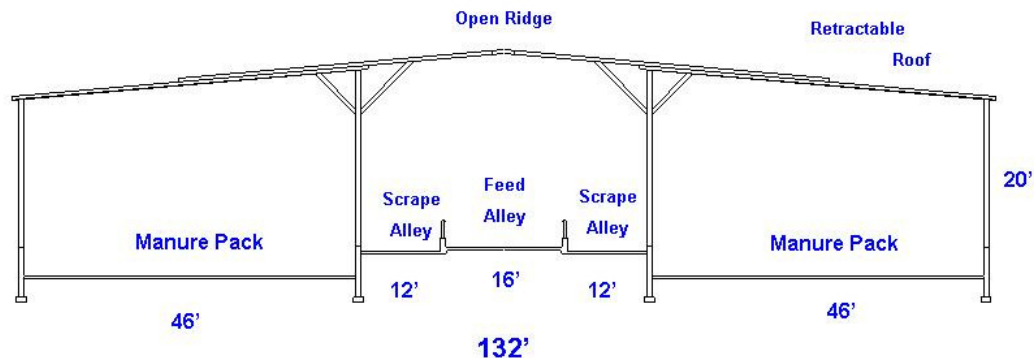


Figure 15 Cross section of Israeli cow shed

Cow Cooling



Figure 16 Holding area used for cooling cows

Cooling the cows was a very important part of the dairy operation. Every holding area used both sprinkler system to wet the cows along with fan systems to dry the cows and evaporate the moisture (Figure 16). On some dairies the cows had free access to the holding area so that they could come to the holding area at anytime during the day to get a “shower” and cool off. On other farms the cows were brought to the holding area at multiple times during the day to cool off.

In the barn itself sprinkler systems and fans were

used extensively along the feed mangers. Large high volume low speed fans were used down the centre of some barns for cooling, and on one farm we saw a system where the fans along the feed manger had an oscillating attachment to allow them to cover a larger area (Figure 17).

Manure Handling

Manure from the bedded pack could easily be handled as a solid manure so that it could be



Figure 17 Oscillating fans along feed alley

trucked off site for field application or for making into compost for wider use. Liquid manure from the scrape alley was removed with automatic alley scrapers and stored temporarily for a one to two week period. The liquid manure would be trucked to a centralized digester where it was used to create biogas.

Feed Handling



Figure 18 Self propelled feed loader and mixer

The group saw a unique innovation at two dairy farms where a cable powered plough was used to push up feed automatically. This device was simple and inexpensive and did a good job. The group also saw a Lely Juno robotic feed pusher at one of the dairies. This particular application of the Juno was unique as the cost of the Juno was shared with the neighbouring dairy producer who had an adjacent dairy about 200 ft away. The Juno was used to push up the feed in the neighbour's dairy barn and then travelled out the back of the one barn over to the adjacent barn and pushed up the feed there.

Most feed was delivered to the farm from feed centres. However, we did visit a dairy that was growing and storing their own feed. It was ensiled in bunker silos similar to Ontario. The dairy also used an RMH mixer (Figure 18) for loading mixing and delivering feed (www.rmhmixer.com). RMH mixers are manufactured in Israel by Lachish Industries and used extensively throughout Israel, the Middle East and Europe, but they have not become popular in North America.



Figure 19 Automatic feed plough for pushing up feed

Solar Power



Figure 20 Solar panel mounted on dairy barn

Roof-mounted arrays were installed on many dairy barns (Figure 20) as well as other agricultural buildings. The price incentives were similar to what producers receive in Ontario. At the one dairy the group visited electricity from the solar panels was being sold for 2.10 NIS (\$0.56 CAD) per kW hours and bought back at 0.5 NIS (\$0.13). The solar array was limited to 50 kW capacity. Solar arrays were also mounted on many industrial buildings as well as commercial buildings in towns and cities.

Summary

The purpose of the PDO study tour to Israel was to learn about the Israeli dairy industry, why Israel has the highest dairy production in the world, and determine what information could be brought home to apply in the Ontario dairy industry.

The group decided that there were a number of factors that contributed towards the tremendous milk production, but the one word that best described these factors was “uniformity”. There was a uniform protocol for cow health care, which involved preventative measures, feeding was done uniformly through feed centres. Cow comfort was practiced uniformly. There always seems to be a consistent approach when it came to managing the dairy herds.

The group decided that there were six possibly seven factors that contributed to the high average milk production:

1. Breeding – Heat Tolerance
 - The Israeli Holstein has been bred specifically for the last 60 years for Israeli climatic conditions
2. Cow Comfort
 - The manure pack housing approach provides tremendous space and comfort for the cows
 - Cow cooling is an important aspect of every housing system
3. Uniform Feeding
 - Very few dairies have the land base to grow their own forages, so rations are provided consistently through centralized feed centres
4. Preventative Health Care
 - Israel has a co-operative veterinarian system that provides uniform care to the member dairies
 - An emphasis is put on preventative health care
5. 3X Milking
 - All cows are milked three times per day
6. Few Low Producing Herds
 - The uniformity of treatment and the small price margins results in few low producing herds
7. “After all it is the Promised Land”
 - One rabbi eluded to a fact that we can never reproduce outside of Israel

The PDO group made a number of other comments and observations:

- The consistent rations provided by the feed centres
- The integration of health services
- The body conditions of the herds
- The close interaction between the whole dairy industry (vets / DHI / herdbook / AI)
- Mostly because they concentrate on one thing and consistently do it well; let other do what they do well and purchase from others
- Technology – cow health improves and reproductive performance improves
- Cow comfort and bunk space

- # of lactations (more production with mature cow)
- Milking 3x
- Vet supervision, mastitis detection and treatment
- Uniformity of rations
- Why is SCC low?
 - The dryness of the environment throughout most of the year
 - the acclimation / genetic selection of the cows to their environment over time

A number of the things that the group observed in Israel can not or won't be duplicated in Ontario like the co-operative veterinarian service, or the centralized feeding centres, but the message of uniformity in treatment and feeding was one that was very clear and can be improved on in most dairies. It is not possible to raise cows on manure packs in Ontario, but again the group saw the importance of cow comfort, and there are always things that can be done to improve comfort. The importance of preventative health care was also observed as is a message that can be applied anywhere.

The participants of the tour experienced a once in a life time opportunity. The dairy industry in Israel is unique and the group acquired valuable information both on the farms and from the related industry. The group also saw how other sectors of agriculture could flourish in a land that many would consider unproductive if they only looked at the obstacles.

Israel is a land rich in history and culture and the group had the opportunity to experience as much as they could in the ten days that went on from dawn to dusk and beyond. It was a tour that none will forget.

Dairy Operations Visited by the PDO Group

Yonatan Maagan Dairy Farm in the Golan Heights

In the face of milk reforms in Israel, and a tougher market, larger operations were seen by many as potentially more profitable. This led to many merges of farms around the country.

Yonatan is a Moshav settlement on the southern part of the Golan Heights. Like many other dairies, its herd was merged with two other herds in 2004, to create a large farm by Israel scale. The three partners agreed that the cows were to be moved to Yonatan due to its location providing excellent conditions for the cows.

- Yoram, one of the owners gave the tour
- Merge of three kibbutz dairies
- Milking 840 cows
- 150 dry cows
- 700 heifers
- 11,500 kg average production
- 3.7% fat, 3.5% protein
- Milk Quota is close to 11M Litres



- D20 milking parlour
- SCC 200,000 high for farm – depend on season
- Cows housed on manure pack

MGO Dairy Farm – Mizra & Givat Oz

Lower Galilee farm located near the town Afula. The farm was established in 2003 as a merge of two kibbutz herds.

- Tour given by Danni the general manager
- 550 milking cows
- 100 dry cows
- 500 Heifers at another site
- 500 beef calves at another site
- Milk Quota 7M litres
- D20 parallel parlour with milk meters, analyzers and other automation
- 11,000 litres per year average production
- 3.7% fat, 3.4% protein
- SCC <220,000
- 37-38 litres/cow in winter down to 32 to 33 litres/cow in summer
- Most of cows in free stall built 7 years ago
- Going to take out free stalls and convert into manure packs
- Building new manure pack barn



Landau Dairy Farm – Ramat Zvi

Typical size family (Moshav) dairy farm, owned and managed by two families.

- Ramat and Brother-in-law and Father
- Milk Quota - 650,000 Litres
- Currently 74 milking cows – milking 58
- D6 herringbone parlour
- 35 litres per cow in summer 40litres per cow in winter
- Fat 3.7 to 3.8% protein 3.4%
- SCC: 130,000 – 140,000
- Manure pack



Mesilot Dairy Farm

Mesilot is a kibbutz in the Jordan Valley, near the city of Beit She'an.

The dairy is managed by Edu, Brazilian in origin, having his approach to dairying. We joined Edu for his morning health visit with his vet and learned a bit about the way herd health is managed in practice.

- Visit with Veterinarian from Hachklait Veterinary Services

- The veterinarian has 11 big farms that he visited twice per week
- 260 cows milking
- Milk quota of 3M litres
- 35 litres per cow per day
- 3.34% protein, 3.74% fat at 225 days
- SCC 220,000 at present in summer 250,000 measured through Afi Lab
- D14 herringbone milking parlour
- Pack barn



Kibutz Metzger

- 230 milking cows in free stalls
- 150 heifers
- 38 kg production (36 kg in summer)
- D12 Parallel Parlour Blue Diamond
- Full SCR solution Dataflow II with Rumination Tags



Uzan Amatz

- 80 milking cows
- Swing 6 parlour
- Manure pack cow sheds
- Heatime with Activity Tags

Kfar Vitkin

- Milking 62 cows
- Milk quota 30,000 litres
- D6 herringbone parlour
- Daily yield 33-34 kg per cow
- Average annual production of 11,500 kg
- 150,000 to 170,000 SCC
- Pack barn

