

Guidelines for Pig Welfare in Israel

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ABSTRACT

Pig production in Israel is limited to about 20 farms, producing approximately 200,000 pigs per year. In January 2013 “Guidelines for Swine Keeping” in Israel became effective, regulating minimal standards for space requirements of pigs, use of individual crates for sows, correct implementation of castration, tail docking and teeth clipping. This article compares the “Guidelines” in place in Israel with the European Council Directive 2008/120/EC of 18 December 2008 (minimum standards for the protection of pigs) and legislations in place in other European Countries to further improve the Council Directive. Furthermore this article summarizes the findings of Veterinary Services inspections carried out in 2013 in Israel with the purpose of verifying the compliance to the Guidelines by local pig farmers. Corrective measures imposed for non-compliant farms are also indicated.

Keywords: Pig, welfare, castration, insemination, farrowing crate, environment.

INTRODUCTION

In the last 3-4 years, pig production in Israel has reached an average of 200,000 slaughtered heads per year, totaling a production of around 16,000 tons of meat per year and representing around 45-47% of total livestock slaughtered per year in Israel (1). The numbers above do not truly reflect the total meat consumed yearly, as Israel imports both beef and sheep meat, however the importation of pork is forbidden by law (2). Local production is generated by some two dozens pig farms and is strictly regulated by law (3) which limits since 1962 the regions in which pig farming is permissible. Today pigs farming is mainly located in two regions: south (Kibbutz Lahav) and in the Northern Galilee. Pigs are slaughtered in three slaughterhouses dedicated for this purpose: in the South Kibbutz Lahav and in the north in the towns of I'blin and Meilia. Table 1A summarizes regional productions and slaughtered head per slaughterhouse.

In respect to poultry and other livestock intensively reared for food production, the Israeli public opinion has

Table 1A: Pig production and slaughtering by slaughter plant (2012)

Region	Slaughterhouse	Heads/year
South	Lahav	20,811
North	I'blin	67,063
North	Meilia	109,516
Total for all of Israel		197,390

recently become more attentive and critical with respect to farming conditions for pigs (4). Israeli Legislation contains several elements, under different laws and/or regulations which directly (5) or indirectly (6) have application in pig farming. In addition there are other laws and regulations specifically dealing with topics of public veterinary interest such as health, diseases, drugs administration, slaughter-checks, etc. In September 2012 The Veterinary Services and Animal Health of the Ministry of Agriculture and Rural Development of Israel issued specific “Guidelines for Swine Keeping” (referred to as the “Guidelines”), which entered into force in January 2013, with the purpose of recognizing and standardizing minimal requirements for pig welfare in Israel. These Guidelines consolidate and concentrate in

a unique text containing all the current Israeli Legislation which is applicable in the field of pig farming.

The purpose of this work is: 1. To describe the “Guidelines for Swine Keeping” approved in Israel and to compare it with the current EU Legislation and with national legislations of other EU Countries; 2. To explain the logic and legislative process for which very specific issues and topics are regulated in the framework of more “widely comprehensive” statements and/or articles of already existing legislation and 3. To summarize the results of the inspections at farm level illustrating the main discrepancies with respect to the Guidelines.

THE GUIDELINES

The “Guidelines for Swine Keeping” deal mainly with the following issues:

- owners and employees responsibilities.
- regular inspection of the animals.
- treatment of sick or injured animals; culling or animal deaths.
- minimal surface area space requirements.
- maximum duration of keeping sows in individual crates (after insemination or lactation).
- use of pesticides and disinfectants.
- light, gas levels, environmental temperature.
- drink and feed supply.
- mutilations: castration, tail-docking, ear notching, teeth clipping.

Tables below show comparisons between EU Regulation 120/2008 (7) and the Guidelines (8) in force in Israel today, relative to the main points directly dealing with the welfare of rearing pigs.

The comparison follows the Israeli Guidelines with respect to the closest corresponding article from the EU Directive.

Guidelines for Swine Keeping	EU Directive 2008/120
1) The pig farm owner is responsible for the fulfillment of the provisions set forth in these guidelines. 2) The pig farm owner shall not employ pig farm workers unless they have been properly trained to fulfill the provisions set forth in these guidelines. 3) The pig farm owner shall employ a suitable number of workers to fulfill the provisions set forth in these guidelines.	Article 6: Member States shall ensure that: (a) any person who employs or engages persons to attend to pigs ensures that the person attending to the animals has received instructions and guidance on the relevant provisions of Article 3 and Annex I; (b) appropriate training courses are available. In particular such training courses must focus on welfare aspects.

The Israeli Guidelines firstly recognize the role of the owner of the pigs and attributes to him direct responsibilities both for the fulfillment of the Guidelines and for a correct and sufficient training of the workers. Malpractices deriving from lack of knowledge or training of workers resulting in welfare violations (wounds, malnutrition, etc.) may be directly addressed to the owner of the pigs and may eventually result in criminal proceedings (6).

Guidelines for Swine Keeping	EU Directive 2008/120
4) The pigs shall be checked at least twice daily at the beginning and at the end of each day by an employee instructed in accordance with section 2.	Article 8: Member States shall ensure that inspections are carried out under the responsibility of the competent authority in order to check that the provisions of this Directive are being complied with.

The EU Directive does not impose on farmers a regular checking of animals in the farm, however on the other hand inspections are carried out by the authorities with the purpose of verifying the implementation of the Directive on the farm. In the Guidelines, regular check of pigs' conditions is a duty which must be carried out daily.

Guidelines for Swine Keeping	EU Directive 2008/120
5) Injuries and diseases: a) In every pig farm there shall be a space for isolation and treatment of pigs which are sick or injured. b) Pigs which are sick or injured shall be kept in a separate stall or pen designated for such purpose.	Article 3 8. ...(<i>pigs</i>) that are sick or injured may temporarily be kept in individual pens. In this case the individual pen used shall allow the animal to turn around easily if this is not in contradiction with specific veterinary advice.

The Guidelines require the separation of sick animals from healthy ones, and if necessary to isolate animals in individual stalls with minimal dimensions (1.5 m² for 100 kg fattening pigs and 4 m² for gilts/sows). In the EU Directive, keeping sick or injured pigs in a separate pen is in alternative to keeping them in groups in cases of aggression or disease. In comparison with other Countries' legislations, Denmark has specific demands for sick bays for diseased animals or those requiring special attention and it requires no less than 2.8 m² per animal, minimum pen area and no less than 3.5 m² for breeders, of which total solid floor, 0.95 m² in gilts, and no less than 1.3 m² for sows (9). The Swiss Confederation Regulation requires daily checks for pigs with “wounds, limping, diarrhea and other disease symptoms”,

and a double daily check at the proximity of farrowing and of neonates (10).

Guidelines for Swine Keeping	EU Directive 2008/120
5) Injuries and diseases e) Severely sick or injured pigs (dying, with broken limbs, paralyzed hindlimbs or with broken spine and so forth), that cannot be treated in a reasonable manner shall be culled, as soon as possible, euthanatized by the veterinarian or by an employee properly trained by the veterinarian. The culling shall be made by one of the methods specified in Annex 1 of these Guidelines.	No mention

The fate of severely sick or injured livestock, in general, is controversial. Final purpose of rearing livestock is meat production, which is obviously obtained through appropriate slaughtering in approved and controlled plants. Preliminary to slaughter is livestock transportation to slaughterhouses, which is regulated by a specific Law (6) aimed to guarantee animal welfare during transportation. Articles 6(a) 1 and 6(b) 1 strictly regulate transportation of sick and injured animals only if the injury or sickness will not compromise animal's welfare during transport and that the animal will be able to "stand with its own forces". On the other hand, the possibility of "emergency slaughter" at farm level (Regulation concerning animal diseases – livestock slaughtering – 1964 art. 79) has been banned in 2009. In such a situation – unfeasibility to cure; impossibility to transport; impossibility to slaughter on site – the only solution in order to avoid unnecessary suffering of the animals is to perform humanitarian killing or euthanasia: "*It is an ethical duty to kill productive animals which are in severe pain where there is no economically viable way to alleviate such pain*" (12).

Killing of pigs on a farm is allowed by the Guidelines for all ages, by a veterinary surgeon with the following agents: Sodium Phenobarbital or euthanasia agent composed by a mix of Mebenzonio, Embutramid, Tetracain and according to dosage and usage recommended by the manufacturer.

As alternative, by a trained employee, only in the following manners:

- using a penetrative captive bolt device, (13, 14); immediately afterwards, the pig shall be slaughtered until completely exsanguinated.
- using a non-penetrative captive bolt device in piglets up to 9 kg.

- using an electrical stunning device (13, 14), in piglets above 9 kg, with intensity of Volt 220; Ampere 1.5; HZ 30-60.

The minimum electric stunning time should be no less than 7-10 seconds and no more than 10 seconds. Immediately after the stunning the pig shall be slaughtered until completely exsanguinated.

Euthanasia of non-curable pigs is regulated also in non-EU Countries, like Australia (15) and USA (16). Current Israeli Legislation relates to a list of notifiable diseases allowing isolation (17, ch.4) and for euthanasia-killing (17, ch.7) of sick or suspected animals. In such a framework, the Guidelines fill the void for incurable diseases but not notifiable diseases and in relation to the animals' suffering only.

Guidelines for Swine Keeping	EU Directive 2008/120
6) Dead pigs shall be removed from the stalls and pens where other pigs are kept, immediately upon identification.	No mention

Disposal of carcasses is covered in accordance with the Animal Diseases Regulations (16) (Waste) 1981. The stock keeper shall note every death immediately upon its discovery and shall keep the record for a period of no less than one year. It is to be underlined that the current Legislation (17, ch.5) already obliges for notification about "suspect deaths" and (17, ch.8) the need to take necessary care about the correct disposal of carcasses.

Guidelines for Swine Keeping	EU Directive 2008/120																								
7) The area that is used for pigs (hereinafter – "The Area") shall be constructed in such a way as to allow all pigs to lie down at the same time.	Article 3,1 (a): The unobstructed floor area available to each weaner or rearing pig kept in a group, excluding gilts after service and sows, must be at least:																								
8) If the floor of the pen is a continuous solid floor, an additional 15% shall be provided in order to use it for drainage openings.	<table border="1"> <thead> <tr> <th>Live weight</th> <th>(kg)</th> <th>sq. m</th> </tr> </thead> <tbody> <tr> <td>Not more than</td> <td>10</td> <td>0,15</td> </tr> <tr> <td></td> <td>10 to 20</td> <td>0,20</td> </tr> <tr> <td></td> <td>20 to 30</td> <td>0,30</td> </tr> <tr> <td></td> <td>30 to 50</td> <td>0,40</td> </tr> <tr> <td></td> <td>50 to 85</td> <td>0,55</td> </tr> <tr> <td></td> <td>85 to 110</td> <td>0,65</td> </tr> <tr> <td>More than</td> <td>110</td> <td>1,00</td> </tr> </tbody> </table>	Live weight	(kg)	sq. m	Not more than	10	0,15		10 to 20	0,20		20 to 30	0,30		30 to 50	0,40		50 to 85	0,55		85 to 110	0,65	More than	110	1,00
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10) Boars shall be kept separately, each provided with an area of no less than 6 sqm.	(b): the total unobstructed floor area available to each gilt after service and to each sow when gilts and/or																								

sows are kept in groups must be at least 1,64 sqm and 2,25 sqm respectively.

When these animals are kept in groups of fewer than six individuals the unobstructed floor area must be increased by 10 %. When these animals are kept in groups of 40 or more individuals the unobstructed floor area may be decreased by 10 %.

Contrary to the EU Directive, the Israel Guidelines do not calculate a specific floor area as function of weight and number of animals but more simply impose the requirement of “enough space for all pigs to lie down at the same time”. This is valid for all categories of animals, with excep-

Table 1B: Comparison of the “guideline” surface areas with surface areas according to the EU Directive

EU 120/2008	Surfaces in sqm, according to:		Difference, in %
	Guidelines	Weight, kg (up to)	Guidelines vs EU
0.15	0.22	10	147%
0.20	0.35	20	175%
0.30	0.46	30	153%
0.40	0.65	50	162%
0.55	0.92	85	168%
	1.03	100	
0.65	1.10	110	169%
*1.8 – 1.64 – 1.47	1.52	180	93%
*2.47 – 2.25 – 2.02	1.90	250	84%
* Max – Av – min			

* Max, min: changes in surfaces according to group keeping of sows and gilts; EU Directive 3,1(b) (see also explanation in previous comparative table).

tion of mature boars “in service” (according to interpretation; young boars still “in exercise” are kept according to articles 7, 8 of Guidelines). When considering “space enough to lay down”, pigs’ floor surface area for lying laterally may be calculated according to: squared meters = $0.047 \times \text{Weight}^{0.67}$ (19). According to this calculation, floor surface areas by the weight of the pigs are as represented in Table 1B below.

Some differences exist between EU Countries relative to larger spaces for some categories of animals, as summarized in Table 2 below. As a further comparison, minimal requirements from Swiss Confederation are also presented (10).

Taking into account the anatomical parameter of “surface occupied by a lying pig”, surfaces available for pigs from weaning to slaughter weight (100-110 kg) will result in larger surface areas compared to minimal surfaces indicated in the EU Directive 2008/120. With such a perspective Israel may be considered in line with other countries. Swiss Federation Control Manual (19) refers to “rest area in which all the pigs may lie down without being piled on each other”. Relative to gilts’ and sows’ floor area, the Guidelines accomplish only between 93% and 84% of the EU Directive. Denmark’s requirements for large groups of gilts (more than 20 gilts) at 1.5 square meter per head, while the requirements for large groups of sows are 2.0 square meter per head which is not very much deviant from the Guidelines requirements. Table 3 summarizes different minimal space requirements for gilts and sows in some EU Countries and to the Swiss Confederation regulations.

Requirement of 6 square meters for boars (EU Directive, Ch.2, A) is required in the Israel Guidelines and in the Swiss regulations with increases to 10 square meters when a female is given to the boar for insemination. There is no such

Table 2: Special requirements for minimal surface areas (sqm) in force in different EU Countries and in the Swiss Federation. Guidelines’ requirements are also indicated for a quick comparison with Countries indicated

Weights, kg	up to 10	10 to 15	15 to 20	20 to 30	30 to 50	50 to 85	85 to 110	> 110
EU Directive	0.15	0.2	0.2	0.3	0.4	0.55	0.65	1.0
Austria	0.2						0.7	
Germany				0.35	0.5	0.75	0.75	
Netherlands	0.4		0.4	0.4	0.6	0.8	1.0	1.3
Sweden	0.25	0.28	0.32	0.4	0.55	0.82	1.02	1.18
Sweden – deep litter	0.32	0.38	0.44	0.56	0.8	1.0	1.51	1.75
Swiss Confed.*	0.2	0.2		0.35	0.6	0.75	0.9	1.65
Israel	0.22		0.35	0.46	0.65	0.92	1.1	
* Swiss weights, kg			15-25	25-60	60-85	110-160		

* In Swiss legislation slight differences exist in weight categories.

requirement in the Guidelines following the understanding is that:

-if a boar is given into a group of sows, space would be enough according to Ch. 7, i.e. "to allow all pigs to lie down at the same time".

- if a sow or a gilt is given to a boar for insemination, a similar area of 6 square meters would be adequate, taking into account that the female will not remain there for a long period of time.

Guidelines for Swine Keeping	EU Directive 2008/120
(9) Gilts and sows shall not be kept in an insemination stall and farrowing crate, unless during the following periods– a. In an insemination stall: Sows – up to 28 days from the day on which the weaning of her piglets and at the end of lactation; Gilts – four days before predicted insemination and up to 28 days afterwards; b. In a farrowing crate – in the period between seven days before the predicted day of farrowing and up to 28 days after farrowing, for lactation; c. For the purpose of fostering, the period may be elongated with additional 7 days in the farrowing crate, provided with a reasoned written approval by the veterinary surgeon. d. In any case, where a restrained pig is injured or shows unusual behavior (i.e., when the pig is not calm, jumps, screams in an unusual manner), it should be released immediately and provided with suitable care, in accordance with instructions made by the veterinarian.	Article 3, 4 Member States shall ensure that sows and gilts are kept in groups during a period starting from four weeks after service to one week before the expected time of farrowing.

In the UK and Sweden, pregnant sows (e.g. from date of weaning of piglets, including insemination) and inseminated gilts are kept loose in groups. In The Netherlands sows and gilts should be kept in groups starting from 4 days after service. The Swiss Confederation allows individual pens only for insemination and for a maximum of 10 days. In Denmark and The Netherlands, all the farms with export contracts with the UK, must keep sows loose starting from weaning. According to the Danish Meat Association, between 68 and 75% of sows are kept loose (free, in pens and in groups and not in individual crates) during pregnancy at

Table 3: Different requirements for minimal lying space (sqm) for breeders (gilts and sows) in some EU Countries and in the Swiss Confederation. Guidelines' requirements are also indicated for a quick comparison with countries indicated

Category	Gilts in group of:			Sows in group of:		
	up to 6	6 to 40	more than 40	up to 6	6 to 40	more than 40
EU Directive	1.804	1.64	1.476	2.475	2.25	2.025
Austria	1.85	1.65	1.5	2.5		2.05
Germany	1.85	1.65	1.5	2.5		2.05
Netherlands	2.475	2.25	2.025			
Sweden	1.81		1.64	2.48		2.25
Sweden deep litter				2.5	2.5	2.5
<i>other grouping systems</i>	up to 10	11 to 20	more than 20	1 to 4	5 to 10	11 to 17
Denmark	1.9	1.7	1.5	2.8	2.2	2.0
Swiss Confed.	2.5 (2.0 till 2018)					
Israel	1.10 to 1.64, according to weight			1.9		

the farmer's discretion (22) The UK National Pigs Producers (NPA) has set January 2013 (time limit for EU 120/2008 implementation) and imposed a ban on pork import from non-compliant EU-Countries relative to housing of pregnant sows individually.

All the countries allow isolation of pregnant sows/gilts one week before farrowing in a farrowing crate. In the UK, Sweden, and Swiss Confederation, sows should be kept loose when in the farrowing crate i.e without restraint. Restraint in farrowing crates for lactating sows has been prohibited in Norway since 2003. The Guidelines impose immediate release from restraint in crate during lactation in case of disease, wounds (mainly legs/feet wounds as typically occurs in sows) or when encountering intolerance to restraint (mainly in first farrowing sows).

Guidelines for Swine Keeping	EU Directive 2008/120
11) Pesticides and disinfection products shall not be used in the pig farm, unless in accordance to a valid certificate of registration, as such is defined in the Animal Diseases Ordinance (Chemical Preparations), 5742 – 1982, and enlisted in the inventory of Pesticides and disinfection products, periodically updated and which may be found on the website of Veterinary Services (19)	Annex I – Ch. 2 B (2) Pregnant sows and gilts must, if necessary, be treated against external and internal parasites. If they are placed in farrowing crates, pregnant sows and gilts must be thoroughly cleaned.

The main difference between the EU Directive and Israel Guidelines for cleaning and treating breeders for parasites is that the Guidelines regulate the use of anti-parasitic drugs and disinfectants in order to avoid improper use of substances which could be harmful to animals.

Guidelines for Swine Keeping	EU Directive 2008/120
13) Lighting: a. Should be of an intensity of at least 40 lux and shall be provided for a minimum period of 8 hours per day. b. The lightning should enable them to be thoroughly inspected at any time.	Annex I – Ch 1 2. Pigs must be kept in light with an intensity of at least 40 lux for a minimum period of eight hours per day. 1. In the part of the building where pigs are kept continuous noise levels as loud as 85 dBA shall be avoided. Constant or sudden noise shall be avoided.
14) Gas levels: The maximum levels of gas shall not exceed the following: NH ₃ : 10 ppm CO ₂ : 3000 ppm N ₂ S: 2.5 ppm	Introduction: 3) Council Directive 98/58/EC ... (about) heating and ventilation conditions, more detailed requirements have to be established
15) If the temperature has exceeded 30 °C, the stock keeper shall turn on the ventilation or sprinklers system, where pigs are kept, with the exception of piglets.	Annex I, Ch.1 3. The accommodation for pigs must be constructed in such a way as to allow the animals to have access to a lying area physically and thermally comfortable as well as adequately drained and clean which allows all the animals to lie at the same time

In relation to lighting conditions, Austria, Belgium and Germany require floor space be illuminated with natural light with access either from windows – in the walls or from the roof – with a width equivalent to at least 3% of the floor surface. To this requirement, Germany has added the condition of light intensity of 80 lux for more than 8 hours per day, with the possibility to reduce natural light access to equivalent of 1.5% of floor space. In Sweden, housing for pigs must have “windows for natural light”. The Swiss Confederation demands only 15 lux, while the evaluation criteria are: “the ability to write a report at the height of the animal” and “transparent surfaces of walls or roofs must be no less than 1/20th (e.g 5%) of the floor surface and “8 hours of light at least”.

Regarding air quality: Only Sweden demands specific requirements: <10 ppm for NH₃; <2000 ppm for CO₂; <0.5 ppm for H₂S; <80% Relative Humidity; <10 mg/m³ of dust. It may be interesting to consider that average odor threshold of man to NH₃ is 17 ppm (min 0.043 – max 53 ppm) (20),

for which it can be possible to run an inspection also without a specific NH₃ gauge and relying only on the inspector's odor sensibility.

In relation to environmental temperature the EU Directive simply refers to “thermally comfortable” conditions. The Swiss Confederation Regulations indicates 25 °C as threshold temperature for piglets of at least 25 kg body weight and for boars (10). In any case the behavior of the animals should be considered. A ambient temperature of 30 °C should be provided for at least the first 3 days after birth and again, their behavior during rest should be noted (piled or stretched) (10).

Guidelines for Swine Keeping	EU Directive 2008/120
16) Every pig shall have free access to drinking quality water. The number of the water points (nipples) shall not be less than 1 in every individual stall and not less than 1 for 15 pigs kept in groups. The water pressure shall be adequate and will allow drinking to all pigs, in accordance with their age and needs.	Annex I, Ch.1 7. All pigs over two weeks of age must have permanent access to a sufficient quantity of fresh water.

The EU Directive recommends that water be available starting from two weeks of age, while Austria, Germany, Sweden and Swiss Confederation demand that all pigs should have permanent access to a sufficient quantity of fresh water. The Swiss Confederation also demands measures against freezing, positioning of water nipples according to the category of the pigs and – similarly to Guidelines – a minimal ratio of nipples/pigs equal to 1:12 pigs, which may change to 1:24 pigs in case liquid feed is provided (liquid feed supply is mainly based on whey and is characteristic for pig farming in cheese production areas, like Switzerland or North Italy, with large quantities of whey as a by-product, largely used for its excellent feeding properties for pigs). Furthermore the Guidelines also demand a minimum water-flush per minute according to the category of the pigs (0.5-1.0 liter per minute in piglets to 1.0-2.0 liter per minute in lactating sows).

Guidelines for Swine Keeping	EU Directive 2008/120
17) All pigs must be fed with a quantity, frequency and a diet to satisfy their nutritional needs and eating habits appropriate to their	Article 3,6. Member States shall ensure that sows and gilts kept in groups are fed using a system which ensures that

sex, age and health status. The feed shall be supplied in one of the following manners: a. Continuous access to feed – <i>ad libitum</i> . b. A rationed feed level – adequate trough space is provided to ensure that all pigs can receive their allocation at the same time.	each individual can obtain sufficient food even when competitors for the food are present. Annex I, Ch.1 6 . All pigs must be fed at least once a day. Where pigs are fed in groups and not <i>ad libitum</i> or by an automatic system, feeding the animals individually, each pig must have access to the food at the same time as the others in the group.
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With respect to EU Directive, the Israel and Swiss Confederation appears more stringent and more detailed: The Swiss Regulations demand feeding at least 3 times a day in in-door animals (and daily checks for out-door breeding) and both countries demand minimal length of troughs according to the category of the pigs. Comparison between the two requirements is listed in Table 4 below. Further requirements are indicated in the Swiss Confederation Regulation in case of the use of automatic/sensor troughs also in of feeding *ad libitum* and/or when automatized. In this case the automatic feeding system should ensure feeding of 10 to 20% of the animals at the same time. Sweden regulates the minimum eating space per pig, depending on the weight and size of the pigs. Other EU countries have no extra demands on supply of sufficient food.

Guidelines for Swine Keeping	EU Directive 2008/120
18) Automatic feeding, watering, feed mill, ventilation and heating systems shall be checked by the stock keeper at least twice a day, at the beginning and the end of each day; 19) Automatic feeding, watering, ventilation and heating systems shall be connected to a monitoring system that shall immediately alert the stock keeper in case of any malfunction.	No mention.

Table 4: Length of troughs with respect to weight/dimensions of pigs

Weights, kg	length of trough, cm	
	Swiss Confed.	Guidelines
15	12	13 (10 kg)
15-25	18	
25-60	27	22 (up to 50 kg)
60-85	30	
85-110	33	28 (51-110 kg)
110-160	36	
sows – boars	45	40

Only the Guidelines and the Swiss Confederation Regulations require daily checks for water, food and health status.

Guidelines for Swine Keeping	EU Directive 2008/120
21) Mutilation and surgical operations: In this section – mutilation – Any actions causing damage or loss of live tissue of the pig’s body, not for therapeutic or diagnostic purposes. Mutilations are forbidden, except in accordance with the following – a) Castration, tail docking and teeth clipping is allowed in a piglet before the seventh day of life if the procedure is performed by veterinary surgeon or a trained operator adequately trained and preformed with cleaned and disinfected equipment; b) Any mutilation is forbidden, including castration, tail docking and teeth clipping, in piglets after the seventh day of life unless it is performed under anesthetic or a local prolonged analgesia by a veterinary surgeon;	Introduction <i>whereas</i> 11) Tail-docking, tooth-clipping and tooth-grinding are likely to cause immediate pain and some prolonged pain to pigs. Castration is likely to cause prolonged pain which is worse if there is tearing of the tissues. Those practices are therefore detrimental to the welfare of pigs, especially when carried out by incompetent and inexperienced persons. As a consequence, rules should be laid down to ensure better practices Annex I, Ch 1, 8) All procedures intended as an intervention carried out for other than therapeutic or diagnostic purposes or for the identification of the pigs in accordance with relevant legislation and resulting in damage to or the loss of a sensitive part of the body or the alteration of bone structure shall be prohibited with the following exceptions: — a uniform reduction of corner teeth of piglets by grinding or clipping not later than the seventh day of life of the piglets leaving an intact smooth surface; boars’ tusks may be reduced in length where necessary to prevent injuries to other animals or for safety reason., — docking of a part of the tail. — castration of male pigs by other means other than tearing of tissue., — nose-ringing only when the animals are kept in outdoor husbandry systems and in compliance with national legislation. if castration or docking of tails is practiced after the seventh day of life, it shall only be performed under anesthetic and additional prolonged analgesia by a veterinarian.
22) Marking – a. Pig marking by a burn or ear cutting is forbidden. b. Pig marking by a tattoo or ear tagging is allowed.	

Among mutilations or surgical procedures, castration of piglets generates the highest concerns both from produc-

ers and consumers, including animal welfare activists. It is a matter of fact that meat from entire and sexually mature males (around 6 months of age, with breed differences) may be repulsive to consumers due to its typical odor, indicated as “boar taint”. Boar taint is an unpleasant odor and flavor mainly induced by androstenone and skatole, which accumulates in the fat of entire males. This taint decidedly affects the pork meat industry in a negative way and an answer to this problem should be sought in respect to animal welfare concerns. It is also a matter of fact that young piglet castrations in EU-Countries and in Israel have reached an “industrial” dimension with respectively some 80-100 million castrations in Europe (23) and 100,000 heads yearly castrated in Israel respectively. Concerns are arising in the public about the castration itself and its practice. For a long time, it was believed that neonates do not suffer from pain because of the immaturity of their neural development (e.g. incomplete myelination of the nerve fibers). However, recent data on humans and rodents have clearly demonstrated that neonates can suffer from pain and may even experience exacerbated pain since the endogenous mechanisms of pain control are not functional (23).

When taking such a perspective into account it is clear that even if Israeli Guidelines (Article 21(a)) are in agreement with the EU-Directive 2008/120, *Introductory*, 11; and Annex I, Ch. 1 (7), both of them do not solve definitely the welfare issues, but only limit and regulate the problem! Norway, Ireland and UK have already banned piglet castrations; in Spain and Portugal about 60% of piglets are not castrated, specifically for the production of the local ham. In the Swiss Federation, since January 2010, castrations are allowed only within two weeks of age and using anesthesia (10). The Swedish Parliament plans to introduce a mandatory anesthesia of male piglets prior to castration. This provision should be part of the national Animal Welfare Act, valid by January 1, 2016. In the European Union, the pork industries of many countries have issued a shared document in which they underline their voluntary agreement to ban physical castration by 2018 (24).

Concerning other surgeries, Austria forbids nose ringing in outdoor systems. In Israel nose-ringing is not used at all. In Sweden, tail docking and nose ringing are forbidden. Denmark banned clipping of teeth: only canines grinding within first 4 days is allowed; tail-docking only at 2-4 days and no more than half of the tail; castration only at 2-7 days.

In the Swiss Confederation recommendations, teeth clipping, tail-docking, nose-ringing are forbidden and teeth/canines grinding may be carried out only in “single motivated cases” and by an “expert person” (10). In Norway tail-docking and teeth/canines clipping are prohibited.

Relative to tail-docking and teeth clipping the EU Directive requires that “neither tail-docking nor reduction of corner teeth must be carried out routinely but only where there is evidence that injuries to sows’ teats or to other pigs’ ears or tails have occurred” and it recognizes the importance of “environment and stocking densities” as triggering factors, then requiring appropriate changes in rearing conditions.

The Veterinary Services in Israel, together with the Legal Department of the Ministry of Agriculture, are indeed working for a solution to the problem through the introduction of analgesia and age limitations or, as an alternative, anesthesia and analgesia if surgeries are performed later than 7 days of age. This issue will be the object of regulation in the near future.

Concerning the identification of pigs, traditionally ear notching was largely practiced in Israel as well in other countries mainly for the identification of future breeders. Guidelines banning this practice and allowing only ear tags and tattoo are now in force (25). Also microchips are widely used, mainly for sows and in farms using artificial insemination, generally implanted under the skin of the ventral side of the tail.

MATERIALS AND METHODS

Following the publication of the Guidelines on September 2012 in the website of the Israel Veterinary Services, e-mail distribution to all the Veterinarians involved in swine medicine and hard-copy distribution to all farmers, the Guidelines became effective as of January 2013.

Starting in 2013 all Israeli pig farms have been inspected and submitted to an audit by the Veterinary Services. Farms have been inspected and checked relative to each article of the Guidelines. Compliance or non-compliance were noted and discussed on site with the farmers or the responsible person. Non-compliance issues were explained, solutions discussed and a time frame set for corrective measures. In one single case, the owner and workers refused to co-operate during the inspection and even tried to impede it; inspection was nevertheless performed with the support of the “Unit for

Plants and Animal Inspection”. Following initial inspections, follow-up visits were planned with farmers and responsible workers for the assessment of requested changes.

RESULTS

In 2013, 24 farms were involved in pigs rearing, holding a total of 15,042 sows (including pregnant gilts). Immediately noticeable was that yearly output per sow was poor with an average of 14 pigs/sow/year and only one farm surpassing 18 pigs/sow/year. Two farms were found totally inadequate for pigs keeping, especially relative to farrowing crates. In these two farms, in agreement with owners, insemination was suspended, breeders moved out (to other units and/or to slaughter) and a time frame was set to complete fattening of the remaining animals. As of April 2013 one farm was depopulated and a second with some 20 heads was planned for depopulation by end August 2013.

Distribution of the population of sow is indicated in Table 5. Seven veterinarians were involved in pig farming: 4 veterinarians for a single farm each; 1 with responsibility for two farms; 1 veterinarian working with 5 farms belonging to the same owners and 1 veterinarian responsible for 10 farms. Three farms, among them the two farms in process of closing had no attending veterinarian (Table 5).

Compliance with respect to environmental parameters: lighting, air quality and, ventilation, is summarized in Table 6. Note that 1 farm was already in a process of closing (indicated as “closing” in following tables), with only a few hundred fattening pigs, no sows and greater part of structure already not functional or in stage of dismantlement.

Table 7 summarizes compliance of the farms with respect to water availability and floor space. All the inspected farms



Figure 1: Non-compliant floors: cracks and “holes” in breeders and fatteners areas.

were found to regularly and constantly supply water to their pigs. On 7 farms the number of water supply points had to be increased and in a further 3 farms water supply points in farrowing crates were not suitable for piglets. Instructions were given in order to add water supply points and at lower levels for piglets.

In some farms the floors area allocated per pig was totally or partially unacceptable (Figure 1) and instructions were given for improvements of the floor quality. In one case the farrowing crates floors had to be changed involving some 120 farrowing crates for a 650 sows.

In relation to compliance with sows keeping, two pa-

Table 5: Farms grouped according to sows population and according to Veterinarians

Sows population	Veterinarians
Farms number – sows	Vets number and farms cared
1 – > 3,000	4 vets on 1 farm
1 – > 2,000	1 vet on 2 farms
3 – ≥ 1,000	1 vet on 5 farms
7 – 400 to 800	1 vet on 10 farms
7 – 200 – 250	no vets on 3 farms (closing)
3 – 100 – 150	
1 – 20 (closing)	
1 – 35 – “minipigs”	
Total 24	

Table 6: Farms grouped according to environmental parameters

Ventilation	Gases	Lighting – farrowing crates
7 – mechanic	4 – high – acutely felt	17 – adequate
5 – natural	1 – tolerable – felt	5 – inadequate
2 – mixed	18 – not felt	2 – not felt – closing
8 – no ventilation	1 – few animals – closing	
2 – non activated – closing		
Total 24		

Table 7: Water supply/availability and floor adequacy

Water availability	Floors compliance
(1 water point for every 15 heads)	
farms number – status	farms number – status
16 – in compliance	10 – needs restoration
7 – need to add	4 – acceptable – recheck
1 – not activated – closing	10 – compliant
Total 24	

Table 8: Farms grouped according to presence of AI crates/pens and average confinement days of sows.

Individual AI pens	Average days in pens
9 – with AI pens	15 – 0 days
15 – no AI pens (1 closing)	1 – up to 2 weeks
	3 – up to 30 days
	2 – 30 to 35 days
	3 – all pregnancy
Total 24	

parameters were checked: presence of individual crates/pens, generally used for Artificial Insemination (AI) and first pregnancy stage, and the number of days sows are kept in these individual crates/pens. Table 8 summarizes the results and groups the farms accordingly.

Strict time limitations on sows confinement in individual crates was found to be one of the most noticeable results in EU Directive and one of the major points of concern for the public, together with piglets castration. Three farms were found totally non-compliant with the Israel Guidelines, and immediate notifications were forwarded to the owners and managers in order to provide for alterations. Time limits for changes were established to 3 to 4 months and, as in other countries, the cheap and simplest solution was to abolish the separations between the crates, keeping troughs and water nipples, and acquiring pens for loose keeping of pigs (Figure 2).

Restraint of sows during the farrowing–lactation period is also practiced in Israel and the Guidelines regulate this issue limiting the time (up to 35 days) but imposing the release of pigs in the case of wounds (See Figure 3) or intolerant behavior of sows. Use of loose farrowing sows in Israel is

**Figure 2:** Loose sows after crates demolition.**Table 9:** Farms grouped according to length (days) of restrain in farrowing crates and presence of restrained wounded sows

Days in farrowing crates	Restrain of wounded sows
farms – days	farms with-without wounded sows
22 – up to 35	7 – wounded sows restrained
1 – up to 30	2 – wounded sows not restrained
1 – up to 16*	2 – crates without restrain
1 – no farrowings – closing	12 – not seen
	1 – no farrowings – closing
Total 24	

* minipig farm.

unpopular and only present in 2 farms out of 23 (Table 9). Seven minipigs farms have been found non-compliant by keeping wounded sows in restrainers. In these cases precise instructions were given to correct the matter.

The only farm on which sows were kept in farrowing crates for 16 days was on the farm breeding “minipigs” for experimental purposes.

Concerning surgical procedures: during our inspections we have paid special attention to marking and castration. Tail docking and teeth clipping is executed in the first week of age in almost all the farms, while castration presents a wide variability, as summarized in table 10.

Relative to harmful marking, 12 farms were found to be non-compliant. Ear notching was the most widely practiced procedure and identification by burning (just before sending pigs to slaughterhouse) was found only on two farms. For the identification for fattening pigs, in Israel one farm practices ear notching (a round – coin size – hole in one ear) in young piglets and two farms were practicing burn-marking for identification just before sending the

**Picture 3:** Wounded sows kept loose during lactation

Table 10: Farms grouped according to practice of tissues-damaging marking and age at castration

Marking	Age at castration
12 – none	11 – \geq 30 days
10 – ear notch	8 – up to 14 days
2 – burning	3 – up to 7 days
	1 – no castration*
	1 – no piglets – closing
Total 24	

*The single farm not castrating is the “minipig” facility.

pigs to slaughter. All farms have been officially notified to discontinue these practices and indeed they have ceased these practices.

All the farms ceased ear notching immediately after the inspection, while two farms required further warnings and the confiscation of notching tongs, where after the procedure was terminated. An official report was sent to both farms before filing a court injunction. Veterinarians at the 3 slaughterhouses were instructed to report to the Veterinary Services regarding injuries and/or violence, including burn-marking and ear-notching. After 6 months, 4 farms were notified and immediately inspected. In 3 cases ear-notching was related to slow-growth of pigs, marked some 6 to 7 months before and previous to the implementation of the Guidelines.

From a general point of view, even if not included as parameter in the Guidelines and check list, a good standard of hygiene was lacking in almost all the farms with the exception of three. The high price of water and sewage treatment on the one hand and old or only partially renovated structures with non-slatted floor (and no bedding) on the other hand, contributed to a low frequency of washing, especially in fattening areas with the resultant dirt accumulation. Discussions with farmers about this issue were often difficult due to heavy economic implications linked with both intensification of washing or renovation of floors. The latter option even if planned for the medium term, seemed to be the most acceptable.

DISCUSSION

Pig farming in Israel is relatively small, limited to few areas in the country, intensively managed, affected by reduced space availability, high costs of water, extreme weather conditions, and characterized by a generalized low produc-

tion per sow per year. Notwithstanding the adverse general environment, there is no doubt that minimal quality of life conditions should be guaranteed to pigs, in terms of space, water and feed availability, veterinary care, abolition of futile mutilations and strict regulation of necessary mutilations. European legislation represents, for Israel, an excellent reference, but still some issues can be improved also taking into account the pork supply to local market does not have the same fundamental impact on population's alimentary need as in EU or USA. Israel “Guidelines for Swine Keeping – 2012” provides a good base for immediate implementation of minimal holding requirements and immediate abolition of some unnecessary practices. Guidelines also provided both the Ministry and the farmers solid arguments and needed experience in the field in order to draft the more articulated “Rules for Pigs Keeping for Agriculture Purposes (Animal Protection) – 2013” which should be approved by the Israeli Parliament and become effective by 2014.

The impact of the Guidelines, up until this point, can be summarized as follows:

- Abolition of individual pregnancy crates beyond 28 days in all farms;
- Abolition of burn-marking and ears-notching in all farms;
- Progressive reduction of age at castration;
- Reduction of crowding;
- Renovation of unsuitable floors;
- Improvement of water point distribution;
- Improvement of ventilation;
- Progressive and growing involvement of Veterinarians;
- Exchange of information with slaughterhouses with respect to welfare issues (prompt notification of burn-marks or ear-notches, etc).

Regarding release of injured pigs to loose holding, only regular inspections service will obtain the result of increasing sensitivity among farmers and workers, changing their attitudes to the problem of sows' restraint with regular checks of the sows health and accordingly opening the restraint of the pigs.

There still remains open issues to be solved: humane killing procedures implementation; hygiene; potential abolition or reduction of both insemination and farrowing restraining crates.

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