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Northern Fowl Mite Management

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Welcome.Editors **Note**

ThePoultrySite Digital

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Editor
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In this month's issue of *ThePoultrySite Digital*, we return to the all-important theme of 'Health & Disease'.

The lead feature is about recent advances in the control of necrotic enteritis. This infection remains a challenge to the poultry industry but progress on the development of a vaccine represents a promising bright spot on the horizon, according to Professor Van Immerseel of Ghent University in Belgium.

Researchers at Mississippi State University in the US address the problem of the northern fowl mite, a common parasite of poultry. Indeed, it is regarded as the primary and most serious ectoparasite of poultry in North America. As treatment options are limited and may be only partially effective, prevention is the best approach for this tricky pest, they conclude.

Also in this issue, seasoned poultry industry watcher, Terry Evans, turns his attention to the likely future trends in the European chicken meat sector, where the strongest growth has been recorded in recent years in Russia and Ukraine.

And finally, we have a report on a chicken farm in France, where the farmers have invested in a simple but effective new heating system that is helping to boost broiler margins using a widely available and renewable energy source.

Jackie Linden

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Taking a Fresh Look at Necrotic Enteritis

Necrotic enteritis remains a challenge to the poultry industry but the progress on a vaccine represents a promising new development on the horizon, according to Professor Van Immerseel of Ghent University, speaking at a recent veterinary conference. Senior editor, Jackie Linden reports.

Necrotic enteritis is an emerging problem, explained molecular biologist, Professor Filip Van Immerseel, and its study reflects the work in his lab in the Faculty of Veterinary Medicine at the University of Ghent in Belgium.

He was presented with an award by the Houghton Trust and invited to present the Avian Pathology Lecture at the 18th World Veterinary Poultry Association (WVPA) Congress in Nantes, France in August 2013.

Clostridium perfringens:
Causative Bacterium

Gut inflammation with necrosis is the main feature of necrotic enteritis, explained Professor Van Immerseel. It is caused by *Clostridium perfringens*, a Gram-positive, spore-forming bacterium that is hard to eradicate. It is unable to synthesise for itself more than 10 amino acids.

"NetB toxin is the key v-irulence factor"

It is the toxins produced by the bacterium that result in the tissue damage. These characteristics explain why the bacterium is both hard to eradicate and associated with high-protein diets. It causes disease in both Man and animals.

The different *Cl. perfringens* types are currently classified according to which of five toxins types they produce, although this method is not ideal as scientists have now identified 14 different toxins produced by this species. Some of the toxins are enzymes.

The different types of *Cl. perfringens* produce specific symptoms in the species affected, which include horses, cattle, sheep and pigs as well as Man and poultry. In poultry, the necrotic foci are initially found in the gut.

The clinical form is rarely seen; it is the subclinical form that represents significant economic cost to producers, which has been estimated to cost between $300 and $1,500 per flock in the US.

Professor Dick Jones of the Houghton Trust (left) presented the Avian Pathology Award to Professor Van Immerseel at the WVPA Congress in Nantes

Diagnosis is based on recognition of lesions in the gut. The first sign is a reduction in villus length, which then develops into necrotic areas.

Pre-disposing Factors: an Opportunistic Pathogen

The host and bacteria will not always lead to disease, even where numbers are high, said Professor Van Immerseel. In 2005, a complex scheme was published covering all the factors involved. However, the main one is the presence of coccidiosis, so the use of dietary anticoccidials is generally effective to control necrotic enteritis.

A pathogenic form of *Cl. perfringens* must be present, of course.

Among the dietary factors involved, necrotic enteritis is associated with high-protein diets, especially those including animal protein (particularly fishmeal), along with non-starch polysaccharides, complex carbohydrates present in wheat, barley and rye. Feed enzymes can reduce the risk of necrotic enteritis, while other components that cause gut damage, such as mycotoxins, may pre-dispose towards the disease.

Management factors exacerbating the risk of disease include wet litter and high stocking density, because of their association with increased stress in the birds.

Pathogenesis of Necrotic Enteritis

The early work on the disease was started in 1974, when the pathogen was called *Bacillus welchii* but most of our knowledge has been generated since about 2003. The first report of necrotic enteritis in poultry was actually in 1967 in Australia and the first good description was reported four years later.

The ban on antimicrobial growth promoters in the EU in 2006 boosted research into alternatives.

"Vaccination - either in-ovo or at day-old - with the NetB toxin seems to be a promising development."

Typing of *Cl. perfringens* has resulted in molecular pathogenesis and the development of vaccines as the main topics of research.

Investigations into how *Cl. perfringens* causes damage to the gut have shown that the bacteria become attached to the mucus layer of the villi that line the intestine wall, where they multiply, causing damage to the epithelial cells. This causes a release of proteins into the gut lumen, on which the bacteria feed.

The gut does repair itself but this is the reason for the drop in performance associated with subclinical infections.

The alpha-toxins were for some time thought to be the main virulence factor for *Cl. perfringens* but it has since been found in healthy flocks too. It appears that it is the isolate that is important rather than the expression of alpha-toxin in itself. An alpha-toxin mutant from one outbreak has been found to cause disease in a trial at Monash University.

The same team isolated necrotic enteritis toxin B (NetB). Its mutants did not lead to gut lesions.

NetB toxin is the key virulence factor and appears to be crucial in the development of disease in poultry, said Professor Van Immerseel. Its crystal structure has now been established.

Cl. perfringens is known to secrete a number of enzymes, which include proteases that break open the epithelial cells and lead to infection and the leaking of nutrients into the gut lumen.

Host Factors

Immunoglobulins play an important role, he said, likely related to the decline in material antibodies at three to four weeks of age, which is the peak time for the occurrence of necrotic enteritis.

The link to coccidiosis is thought to be the characteristics of its causative pathogens, Eimeria spp., to boost the production of

Professor Filip Van Immerseel, speaking at the WVPA Congress 2013

mucus (mucogenesis) in the gut. This leads to an overgrowth of *Cl. perfringens*.

One clone is always found in the gut of birds with necrotic enteritis and it appears to inhibit other clones.

Other bacterial factors may also be involved, said Professor Van Immerseel. For example, some strains of *Cl. perfringens* stimulate the production of the volatile fatty acid, butyrate, which stimulates enteric cell regeneration.

Controlling Necrotic Enteritis

Effective control can be achieved by killing the bacteria so antibiotics work, as do organic acids and essential oils, he explained.

Vaccination - either in-ovo or at day-old - with the NetB toxin seems to be a promising development.

Dr Van Immerseel summed up by saying that necrotic enteritis remains a challenge. Whilst its pathogenicity is not yet fully understood, useful progress is being made in this area.

He said that the identification of the NetB toxin was a breakthrough. While some tools to control the disease are already available, a vaccine based on the NetB toxin is under investigation and represents a promising new development, he added. ■

Northern Fowl Mite Management

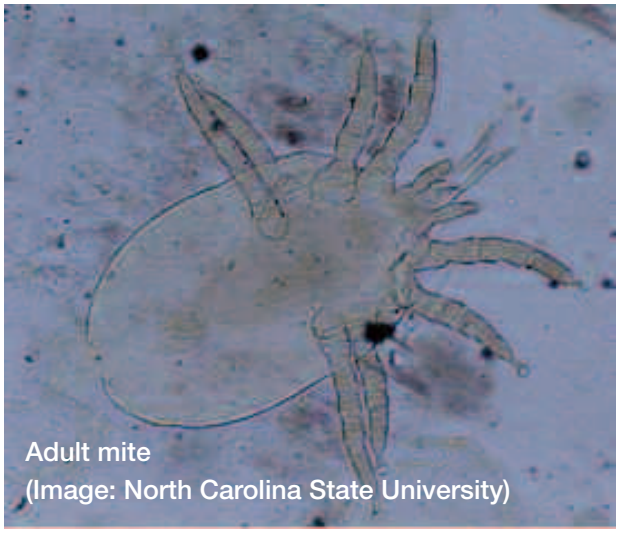
Treatment options for these external parasites are limited and may be only partially effective, which makes prevention even more important, according to Tom Tabler (Extension Professor), Haitham M. Yakout (Visiting Research Professor) and Jessica Wells (Extension Instructor) of the Poultry Science Department of Mississippi State University.

The northern fowl mite, *Ornithonyssus sylviarum*, is regarded as the primary and most serious ectoparasite of poultry in North America (Axtell and Arends, 1990). Mites and lice are the most destructive external parasites of poultry flocks (Goddard and Edwards, 2010). The northern fowl mite is common on wild birds and rodents, which readily introduce it into commercial poultry production facilities unless sound biosecurity practices are in place.

Its entire life cycle is spent on the host, where it feeds on blood and is a source of irritation to the bird. Eggs are laid in masses at the base of the feathers, usually in the vent area. It is one of three species of fowl mite that are ongoing pests of commercial breeder and layer flocks.

The other two are:

- the chicken mite or red poultry mite (*Dermanyssus gallinae*), which stays hidden in cracks and crevices in the poultry house during the day and comes out to feed on the birds at night, and
- the tropical fowl mite (*Ornithonyssus bursa*), which has similarities to the northern fowl mite.



Adult mite
(Image: North Carolina State University)

Because the red poultry mite remains hidden much of the time and can go for long periods without feeding, it is very difficult to detect - unless birds are inspected at night when mites are feeding - and even more difficult to control. The tropical fowl mite is often confused with, and has similar behaviour patterns to, the northern fowl mite.

Life Cycle and Transmission

The eight-legged adult northern fowl mite is about 1/26 inch long and dark red to black.

There are four stages in the mite life cycle: egg, larva, nymph, and adult. The complete life cycle from egg to egg-laying female can be as little as five to seven days. This can result in rapid increases in mite populations, especially on layers and breeders kept for extended periods.

Female adult mites lay eggs directly on their host. The eggs hatch in one to two days, depending on the temperature and humidity. The larvae that hatch do not feed on the bird; however, larvae rapidly moult to the nymphal stage in about eight hours (Kaufman et al., 1998). The nymphs do feed on blood from the birds and mature in four to seven days.

Adult female mites complete the egg-laying process in two days after taking a blood meal from their host. The number of eggs laid per female is relatively small - usually two to five. However, the short life cycle means that mite populations can rise rapidly, with newly infested birds capable of supporting a mite population in excess of 20,000 per bird in nine to 10 weeks under favourable conditions (Williams, 2010). Mites tend to congregate near the vent area but the back is also a popular site as the mite population increases.

Birds infested with large northern fowl mite populations may suffer severe anaemia and even death. DeLoach and DeVaney (1981) reported that heavy infestations can remove as much as six per cent of the blood volume of a commercial laying hen per day. Heavy infestations on commercial pullets as they begin laying can cause a 10 to 30 per cent mortality rate (Strother, 2008). Mite-stressed birds usually reduce feed intake, lose weight rapidly,

Keeping wild birds and rodents out of production houses means sealing up the holes and any possible entry points, including :

- end doors
- electrical conduits and feed and water lines where they enter the building
- fan housings
- along eaves and at building corners
- ridge vents and other air inlets
- sidewall curtains
- evaporative cooling systems (dog houses)
- damaged siding or foundations.
- Monitoring birds on a weekly or bimonthly basis is critical to detecting a mite problem early.

(Stringham and Watson, 2003)

may exhibit a pale pink comb (a symptom of anaemia) and may have lowered egg production of 10 per cent or more (Williams, 2010). Heavy infestations may make birds more susceptible to other parasites and diseases that can result in death (Strother, 2008). In broiler breeder flocks, mites are also thought to impact semen production in males. However, the literature is not in total agreement on all impacts or at what level these impacts exist (Hogsette et al., 1991).

Northern fowl mites prefer temperatures around 65 to 68°F and are often more of a problem during cool weather but they may be found on birds at any time of year. Even though they spend the majority of their time on the host, a well-fed northern fowl mite may survive for two to three weeks off the host at room temperature. Therefore, depopulating an infested flock and moving birds back into the house sooner than three weeks may not totally resolve a mite problem. However, northern fowl mites are not as hardy as red poultry mites (which can survive without feeding for several months) and generally die within three to four days without a host.

Mites are easily transmitted from bird to bird by direct contact or by crawling from one bird to another. A mite-free house can become infested by several different methods including people, a contaminated pullet hauling trailer, the introduction of an infested pullet flock, wild birds, rodents or contaminated egg flats and racks that are hauled from farm to farm by the egg truck. Birds older than 40 weeks usually do not support large mite populations but populations can build rapidly on birds 20 to 30 weeks of age (Williams, 2010). A severe northern fowl mite infestation can develop and spread through a flock in three to six weeks.

Light infestations of mites often go unnoticed and are difficult to identify. You may notice mites on eggs or egg handlers before they are found on the birds. However, by the time mites start showing up on eggs or workers begin to complain of mites, the infestation is usually well past the light stage and into the moderate or heavy stage.

Individual mites on birds are nearly microscopic and may easily be missed as they crawl quickly across the skin near the vent area. Heavier infestations are easier to find because they produce a dark grey discoloration and matting of feathers around the vent. The discoloration is the result of large populations of mites, mite eggs, their faeces and shed skins.

Best Control is Prevention

Prevention is by far the best and most effective method of fowl mite control.

Take steps to exclude mite vectors such as wild birds and rodents from the poultry house, and prevent the movement of mites from one farm to another on egg flats, racks, other equipment or people.

Promptly clean up spilled feed around feed bins or elsewhere before it attracts wild birds and rodents.

Maintain bait stations along exterior and interior poultry house walls year-round, when birds are present and in between flocks.

Also monitor rodent activity around generator sheds, well houses, stacking sheds, and other nearby buildings, and take appropriate measures to control the rodent population.

Mite indexing systems that assign a one-digit number to various infestation levels have been in place for a number of years. However, they are often time-consuming and require the examination of a fairly large number of birds to get an accurate estimation for the flock. A typical mite index may be similar to the following:

- 0 = no mites
- 1 = 1 to 50 mites (light infestation)
- 2 = 50 to 1,000 mites (moderate infestation) - small clumps of mites on skin and beginnings of discoloration and matting around feathers
- 3 = 1,000 to 25,000 mites (moderate to heavy infestation) - more discolouration and accumulation on feathers and around vent
- 4 = more than 25,000 mites (heavy infestation) - numerous large clumps of mites on skin and feathers, and skin pocketed with scabs.

Even though a one-digit rating system based on the number of mites per bird has been the standard for years, a more practical system may be simply a “present” or “absent” designation on seven to 30 birds per house in a weekly inspection group, with a percentage of birds with mites present used as a threshold (Stringham and Watson, 2003). The more birds examined each week, the more accurate your monitoring programme will be.

"Treatment options are limited and may be only partially effective, which makes prevention even more important."

In a flock of breeder birds, the roosters often

have higher populations of northern fowl mites than the hens (Axtell and Arends, 1990). Mites readily spread from the roosters to the hens. Therefore, roosters should be examined at a higher ratio to the hens. To date, a vaccine to provide the birds with immunity to mites has not been developed. Although the production of antibodies as a result of mite infestations have been detected, a way to use this information to quantify the level of infestation or predict its impact does not currently exist (Axtell and Arends, 1990).

Prevention is made more difficult simply because any person, wild bird, rodent, animal, vehicle or equipment moving between farms is a potential fowl mite vector. However, Stringham and Watson (2003) recommend these minimal precautions to greatly reduce the likelihood of spreading a fowl mite infestation:

- Isolate infected farms. Readjust traffic flows from infested to clean farms and take precautions with all protective clothing worn.
- At the hatchery, pay close attention to egg deliveries from infested farms. This includes strictly managing personnel, vehicles, racks, egg flats, and other equipment that have contact with infested farms.
- Pullet-moving and clean-out crews should take precautions to limit the risk of spreading a mite infestation, e.g. washing, sanitation, traffic flow.

Treatment Options Limited

Treatment for mites is difficult, expensive, and may be only partially successful.

Unfortunately, mites have developed at least partial resistance to many of the chemicals used to treat an infestation. Furthermore, new promising substitute products for mite control will probably not become available anytime soon.

Sulphur was used as a miticide in the past and is being used again in certain parts of the US with some degree of success (Clark, 2013). Compared to many other products, sulphur is inexpensive and relatively easy to apply but it has to be done correctly and even then, may provide only partial suppression of mite infestations.

Unfortunately, however, many growers are allergic to sulphur or they use it wrongly. They may "dust" it in with a backpack blower and their fans but this gives poor coverage on the birds (Hubbard, 2013). Some growers simply open several bags of sulphur in the house and expect the chickens to "dust themselves"

but this is also ineffective. In addition, the dust formulation method of treatment may not place the active ingredient directly on the birds' skin where it will do the most good.

Products used to kill mites do not kill the eggs, so you have to come back in a few days and treat again (Hubbard, 2013). The seven-day life cycle means that if you wait more than about seven days before treating a second time, a whole new generation of mites have developed from hatched eggs that were unaffected by the initial treatment. Growers often only treat once when it may take at least three treatments strategically spaced close together to get all the mites from recent hatchings.

Another product that has yielded varying degrees of success is diatomaceous earth (DE). Diatomaceous earth is believed to be a natural insect control powder. It is obtained from deposits of diatomite, which are the fossilised sedimentary layers of tiny phytoplankton called diatoms. DE is a form of amorphous silica that can kill insects by absorbing their oily or waxy cuticle layer (Jacob et al., 2011). When this thin, waterproof layer is lost, the insect loses water and dies. In addition to its desiccant action, DE works abrasively to rupture insect cuticles. However, like sulphur, when used as a dust, it may not reach the birds' skin where the mites live. Also, a single treatment will likely not get all the mites that hatch after the initial treatment so the infestation may quickly re-establish itself unless multiple treatments are used at strategic intervals.

In some breeder flocks where nothing else seems to work, extra-label use of ivermectin has proven an effective method of control for the northern fowl mite. Like other products, it appears to work best when at least two treatments are made a few days apart. It is expensive but may be cost-effective depending on the severity of the problem, especially if other options have been exhausted with little or no results. It can sometimes be difficult to keep in solution and has to be used with propylene glycol but even more important, ivermectin is not labelled for use on poultry (Hubbard, 2013). This means you must get a prescription from a licensed veterinarian before using it on breeder flocks.

Summary

Northern fowl mites are a serious threat to breeder and layer flocks throughout North America. Control depends first and foremost on prevention.

Take every precaution to reduce the risk of establishing a fowl mite infestation on your farm:

- Establish a thorough disinfection and treatment program for houses before a new flock is placed.
- Prevent rodent and wild bird access to your houses.
- Bring in only uninfested pullets.
- Monitor birds on a regular basis.
- Control the movement of traffic, equipment, and personnel between clean and infested farms and the hatchery.

Treatment options are limited and may be only partially effective, which makes prevention even more important.■

Global Poultry Trends.**2013**

Russia and Ukraine Lead Europ

Growth in world poultry meat production has slowed in recent years from around 4.5 per cent in 2010 to an estimated 1.8 per cent in 2013 when it is expected to amount to around 106.4 million tonnes, as expansion continues in both developing and developed economies. Population growth, improving real incomes and the continued competitive pricing of chicken have been the key factors in the expansion of the poultry meat sector.

Chicken meat accounts from some 88 per cent of global poultry meat output. For 2011 - the most recent year for data for all countries from the Food and Agriculture Organisation (FAO) - chicken meat production (table birds plus culled layers and estimates of backyard output) amounted to 90 million

pe's Growth

Europe contributes around 16 per cent of total global chicken meat output, reports industry analyst, Terry Evans. The growth in output over the last decade or so has been slow in the European Union but significant increases in production have been achieved in Russia and Ukraine.

tonnes out of a poultry meat total of 102.3 million tonnes.

This year, indigenous chicken meat output should exceed 93 million tonnes while, according to the United States Department of Agriculture (USDA), estimates of broiler production will amount to some 84.6 million tonnes (Table 1).

For 2014, it is possible that global indigenous chicken meat output will come close to 95 million tonnes (Table 1 and Figure 1). The FAO definition of indigenous production is the quantity of meat from slaughterings of home-grown birds plus the meat equivalent from such birds exported live.

During the period 2000 to 2011, chicken

meat production in Europe expanded by a little over four per cent a year from 9.3 million tonnes to 14.6 million tonnes, which was marginally faster than the world total. As a result, Europe increased its share of the global total from 15.9 to 16.2 per cent.

However, for the European Union member countries where output has climbed by 2.1 million tonnes from 8.1 million tonnes to 10.2 million tonnes, the increase rate of two per cent a year was only half the Europe figure. European production outside the Community rose by 3.2 million tonnes from around 1.2 million tonnes to nearly 4.4 million tonnes, or a massive 13 per cent a year.

Table 1. Indigenous chicken meat production* (million tonnes)

Region	2000	2005	2006	2007	2008	2009	2010	2011	2012E	2013F	2014F
Africa	2.8	3.3	3.4	3.7	4.0	4.2	4.5	4.6	4.7	4.7	4.8
Americas	27.1	32.7	33.7	35.0	37.4	36.7	38.6	39.9	40.4	41.2	41.9
Asia	18.6	22.4	23.5	25.0	26.2	28.0	29.1	29.8	30.3	30.7	31.2
Europe	9.3	10.9	10.8	11.6	12.1	13.3	13.9	14.6	14.9	15.2	15.5
Oceania	0.7	0.9	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.3	1.4
WORLD	**58.5**	**70.2**	**72.3**	**76.2**	**80.6**	**83.3**	**87.2**	**90.0**	**91.6**	**93.2**	**94.8**
Broiler meat production (million tonnes)											
WORLD					**72.8**	**73.6**	**77.9**	**80.8**	**82.8**	**84.6**	**-**

**Meat from the slaughter of birds originating in a particular country, plus the meat equivalent of any such birds exported live*
E = estimate; F 2013 and 2014 = 5m forecasts for chicken meat; F 2013 = USDA forecast for broiler meat; - no figure
Regional figures may not add up to the world totals due to rounding.

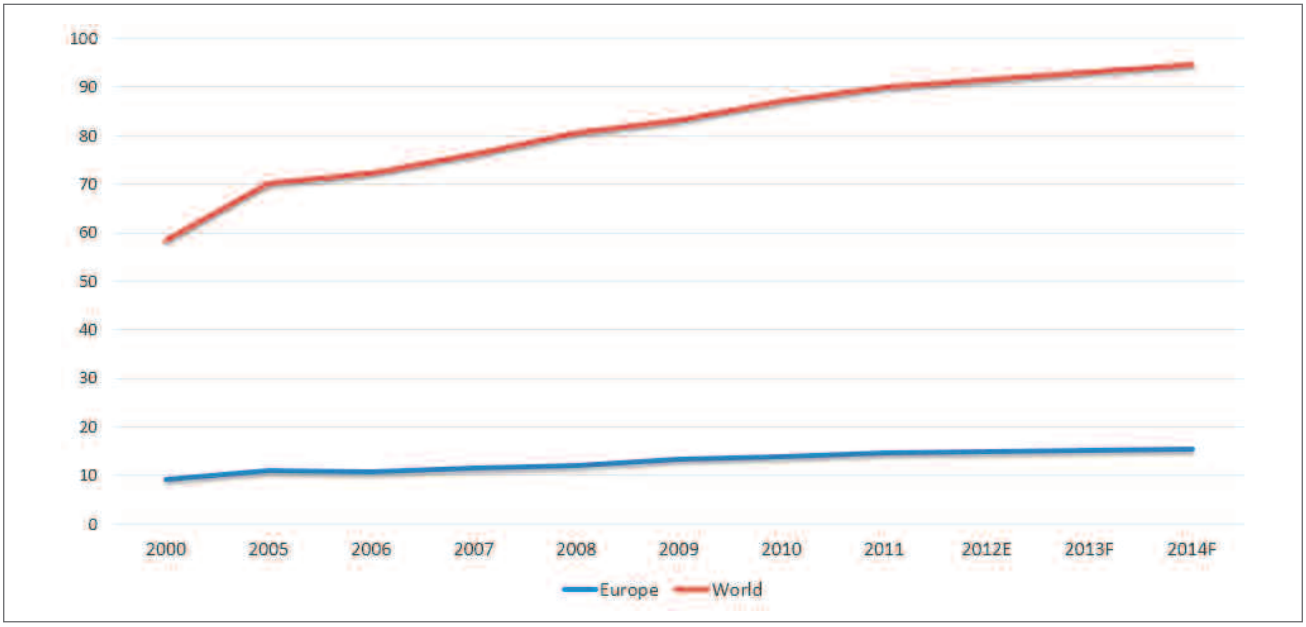


Figure 1. Chicken meat production in Europe compared to global output (million tonnes)

Table 2. Indigenous chicken meat production in Europe ('000 tonnes eviscerated weight)								
Country	**2000**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Albania	2.6	6.9	8.1	9.7	11.9	10.5	11.2	11.9
Austria	83.5	82.7	77.8	80.0	82.0	98.2	104.4	110.8
Belarus	76.1	89.5	124.7	146.2	170.1	203.1	243.2	279.8
Belgium	315.3	313.0	357.2	335.9	334.6	345.3	362.2	362.2
Bosnia/Herzegovina	3.6	8.4	11.7	12.8	35.1	31.1	36.5	44.6
Bulgaria	104.4	75.8	80.3	98.3	104.4	128.9	111.0	107.0
Croatia	23.9	30.3	29.2	30.9	30.7	30.3	23.2	29.5
Czech Rep.	230.0	230.0	230.0	230.0	280.8	291.1	286.9	275.4
Denmark	187.0	182.0	166.0	172.0	176.0	168.0	186.0	186.2
Estonia	7.6	12.8	11.9	10.9	12.4	14.2	14.2	14.8
Finland	65.4	87.6	88.6	98.5	103.8	97.4	89.6	95.3
France	1,273.0	1,165.0	884.3	968.9	1,140.0	1,113.8	1,160.0	1,160.0
Germany	586.9	710.0	610.8	712.4	794.8	865.3	929.0	1,004.0
Greece	107.9	162.1	115.6	111.3	104.0	103.0	103.6	103.0
Hungary	281.8	270.2	249.5	241.1	277.8	268.5	268.7	272.0
Iceland	3.1	5.8	6.7	7.6	7.4	7.2	6.9	7.2
Ireland	84.0	91.0	90.9	92.5	75.7	88.8	103.4	109.7
Italy	761.8	695.0	628.5	733.0	790.3	822.3	865.0	889.0
Latvia	4.9	15.2	20.4	21.0	22.9	20.7	22.1	22.9
Lithuania	25.1	55.8	59.4	61.7	70.2	69.5	75.5	74.6
Macedonia Rep.	3.9	3.0	2.7	0.6	2.2	2.4	3.6	3.0
Malta	6.0	4.4	3.9	4.3	5.0	4.6	4.3	4.1
Moldova	14.3	24.4	29.5	27.1	21.6	21.5	33.7	36.7
Netherlands	631.0	712.2	735.0	698.7	716.3	927.0	877.8	906.3
Norway	43.0	49.8	55.2	62.4	74.7	71.2	75.9	75.1
Poland	531.1	799.8	837.8	903.9	740.8	1,086.4	1,115.1	1,153.0
Portugal	221.3	213.9	204.3	237.8	269.8	288.6	309.5	284.0
Romania	251.1	274.9	234.7	269.4	270.5	302.3	278.9	254.8
Russian Federation	752.2	1,326.7	1,564.0	1,856.2	1,991.0	2,304.7	2,548.9	2,875.3
Serbia	-	-	76.6	70.0	75.1	79.3	85.4	95.9
Slovakia	16.0	78.4	87.3	86.0	93.1	83.8	78.9	65.5
Slovenia	17.7	45.3	43.3	34.4	46.4	47.1	45.9	47.1
Spain	983.5	1,061.0	1,043.3	1,091.2	1,034.4	1,110.7	1,022.1	1,158.7
Sweden	91.3	99.9	102.3	107.0	110.4	109.1	115.0	113.9
Switzerland	39.0	52.7	46.7	56.7	61.3	62.9	66.8	71.1
Ukraine	190.0	463.0	585.2	606.2	685.1	766.0	859.8	880.1
United Kingdom	1,222.0	1,315.0	1,319.7	1,308.4	1,292.8	1,292.2	1,402.7	1,368.9
EUROPEAN UNION	**8,121.0**	**8,785.3**	**8,309.2**	**8,736.2**	**8,977.0**	**9,773.7**	**9,958.7**	**10,169.3**
EUROPE	**9,308.0**	**10,878.8**	**10,824.8**	**11,597.5**	**12,116.7**	**13,338.9**	**13,928.8**	**14,555.0**

- no figure, Source: FAO

Some 2.8 million tonnes (88 per cent) of this gain occurred in just two countries - Russia and Ukraine. Russia was easily the main volume contributor to the increase with production escalating by some 13 per cent a year from 752,000 tonnes to almost 2.9 million tonnes. Although, in tonnage terms, the increase in Ukraine was nowhere near as dramatic, the actual rate of gain at 15 per cent a year exceeded that achieved by Russia (Table 2).

In 2011 just six European countries had annual chicken meat outputs of more than one million tonnes (Table 3), their combined production of 8.7 million tonnes representing nearly 60 per cent of the regional total.

Chicken meat production in the **EU** in the period 2000 to 2011 showed slow growth at two per cent a year from 8.1 million tonnes to 10.2 million tonnes. The USDA's combined broiler meat data for the Union point to an even slower growth rate of 1.4 per cent a year, with output estimates climbing from just under eight million tonnes in 2000 to 9.3 million tonnes in 2011.

For 2013, the forecast is 9.6 million tonnes (Table 4) as, according to a USDA GAIN Report, anticipated declines in France and the UK will more than offset anticipated higher production in the Benelux, Germany and Poland. Indeed, production in France in 2011 was less than in 2000. That the European Commission has halted export subsidies on poultry meat will impact on France's growth potential as the subsidy was exclusively used by two French companies that sell frozen whole birds, primarily to the Middle East.

Regarding the FAO chicken meat production data, the UK with 1.37 million tonnes in 2011

Table 3. Chicken meat production ranking in Europe in 2011 ('000 tonnes)

Country	Production
Russian Federation	2,875.3
United Kingdom	1,368.9
France	1,160.0
Spain	1,158.7
Poland	1,153.0
Germany	1,004.0
Netherlands	906.3
Italy	889.0
Ukraine	880.1
Belgium	362.2
Portugal	284.0
Belarus	279.8
Czech Rep.	275.4
Hungary	272.0
Romania	254.8
Denmark	186.2
Sweden	113.9
Austria	110.8
Ireland	109.7
Bulgaria	107.0
Greece	103.0
Serbia	95.9
Finland	95.3
Norway	75.1
Lithuania	74.6
Switzerland	71.1
Slovakia	65.5
Slovenia	47.1
Bosnia/Herzegovina	44.6
Moldova	36.7
Croatia	29.5
Latvia	22.9
Estonia	14.8
Albania	11.9
Iceland	7.2
Malta	4.1
Macedonia Rep.	3.0

Source: FAO

Table 4. Leading broiler producers in Europe ('000 tonnes)										
Country	**2000**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Russia	410	950	1,180	1,410	1,680	2,060	2,310	2,575	2,830	2,950
United Kingdom	1,163	1,283	1,290	1,261	1,267	1,269	1,380	1,357		
Poland	560	796	824	896	730	1,060	1,123	1,200		
Germany	462	741	749	826	868	911	1,022	1,090		
France	1,242	986	886	993	1,009	1,027	1,042	1,076		
Spain	965	1,045	1,030	1,034	1,059	1,063	1,085	1,073		
Italy	762	666	612	670	713	742	780	788		
Ukraine	20	289	372	475	570	650	733	767	821	903
Netherlands	697	552	547	612	626	655	664	687		
EU - 27	7,970	8,169	7,740	8,320	8,594	8,756	9,202	9,320	9,510	9,550

Sources: AVEC, FAO , USDA

was the largest producer in the EU, closely followed by five countries - France, Spain, Poland, Germany and the Netherlands; these six account for two-thirds of the Community total. When comparing with 2000 clearly the most rapid growth has taken place in Poland, Germany and the Netherlands.

European Commission forecasts on poultry meat output to 2022 suggest that future growth will be extremely slow, with 2022 output at nearly 13 million tonnes, which is only some four per cent above the 2011 level of 12.4 million tonnes. In July this year, Croatia became the 28th member of the EU. However, this country's impact on Community chicken meat production is negligible.

Russia is clearly the leading chicken producer in Europe. For 2011, the FAO's estimate of output came close to 2.9 million tonnes (Table 2), while the USDA's estimate for broiler production in that year stands at 2.6 million tonnes. Both sets of figures point to an annual growth of around 12 per cent. However, USDA economists consider that the rate of expansion slowed to less than 10 per cent in 2012, and again to a little over four per cent this year when broiler output is expected to reach 2.95 million tonnes (Table 4 and Figure 2).

This could point to a chicken meat figure of around 3.3 million tonnes, representing around 20 per cent of Europe's total compared with only eight per cent back in 2000. However, a recent USDA GAIN Report considers that Russia's broiler output in 2013 will exceed earlier expectations and could reach 3.05 million tonnes, rising to 3.3 million tonnes in 2014.

Russia's latest Poultry Programme envisages that poultry meat production will reach four million tonnes by 2015. Only some nine per cent of this is expected to come from private farms. Broiler output from agricultural poultry establishments is forecast to reach 3.35 million tonnes while turkeys are anticipated to contribute around 168,000 tonnes and spent

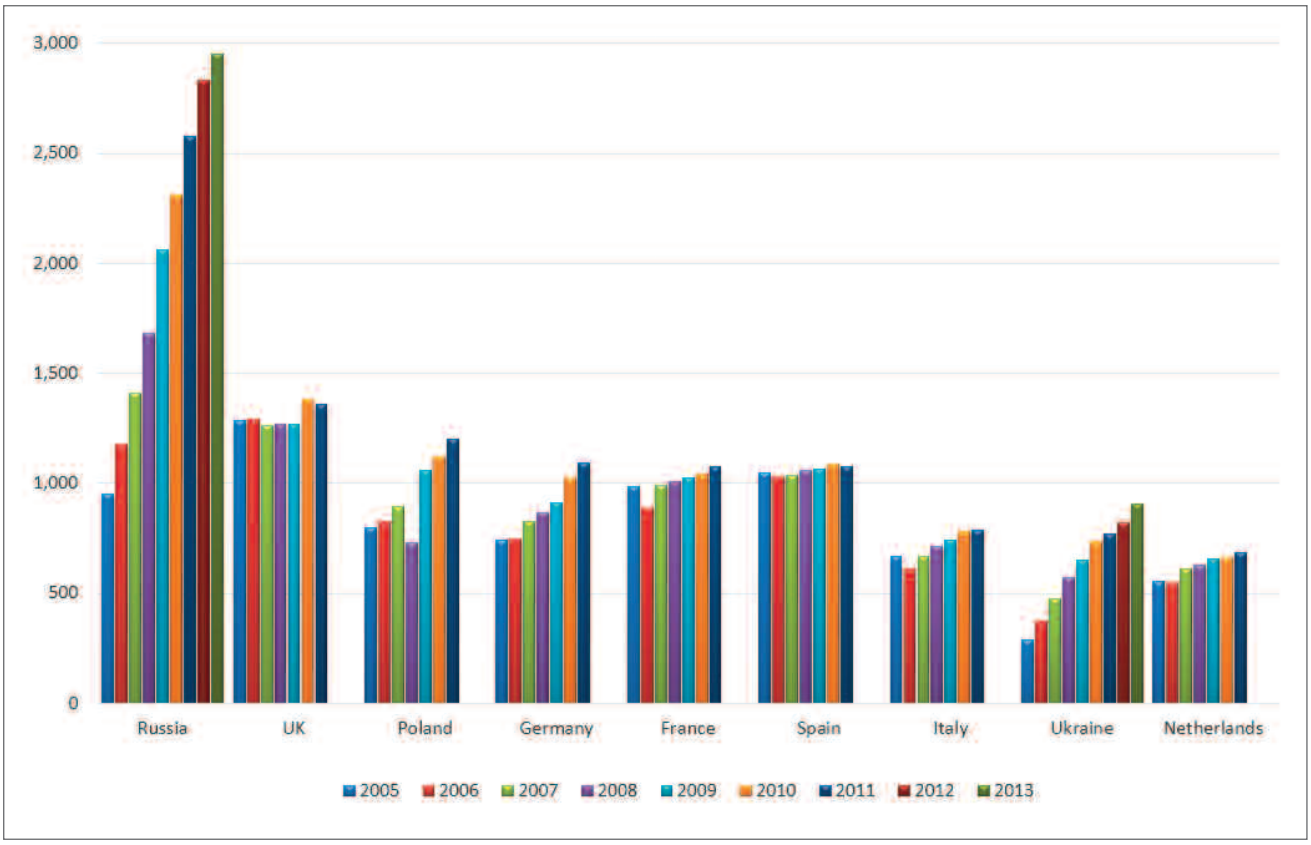


Figure 2. Chicken meat production in leading European broiler-producing countries ('000 tonnes)

hens, 108,000 tonnes. Expansion is being encouraged via subsidies from the Ministry of Agriculture from August 2013, coupled with lower feed prices.

As its broiler industry has expanded, chicken meat production in **Ukraine** has escalated from just 190,000 tonnes in 2000 to 880,000 tonnes in 2011. The industry commenced significant expansion in the early 2000s and in the following years, producers concentrated on optimising existing facilities and reducing risk through vertical integration.

According to a USDA report, owning feed mills, which is common for large production enterprises, quickly expanded into the acquisition of land, machinery, distribution centres, logistics and even retail chains. In 2013, broiler production, forecast at more than 900,000 tonnes, will for the first time, exceed domestic consumption (Table 4). If correct, then chicken meat output will currently exceed one million tonnes.

Future expansion will be closely linked to any growth in exports which, in turn, will greatly depend on an expansion of trade with the EU, this market having been opened up for Ukraine late in 2012. In 2013, it is envisaged that sales to the Community could amount to 55,000 tonnes, while some observers consider that the Ukraine has the potential to sell as much as 200,000 tonnes to European countries.■

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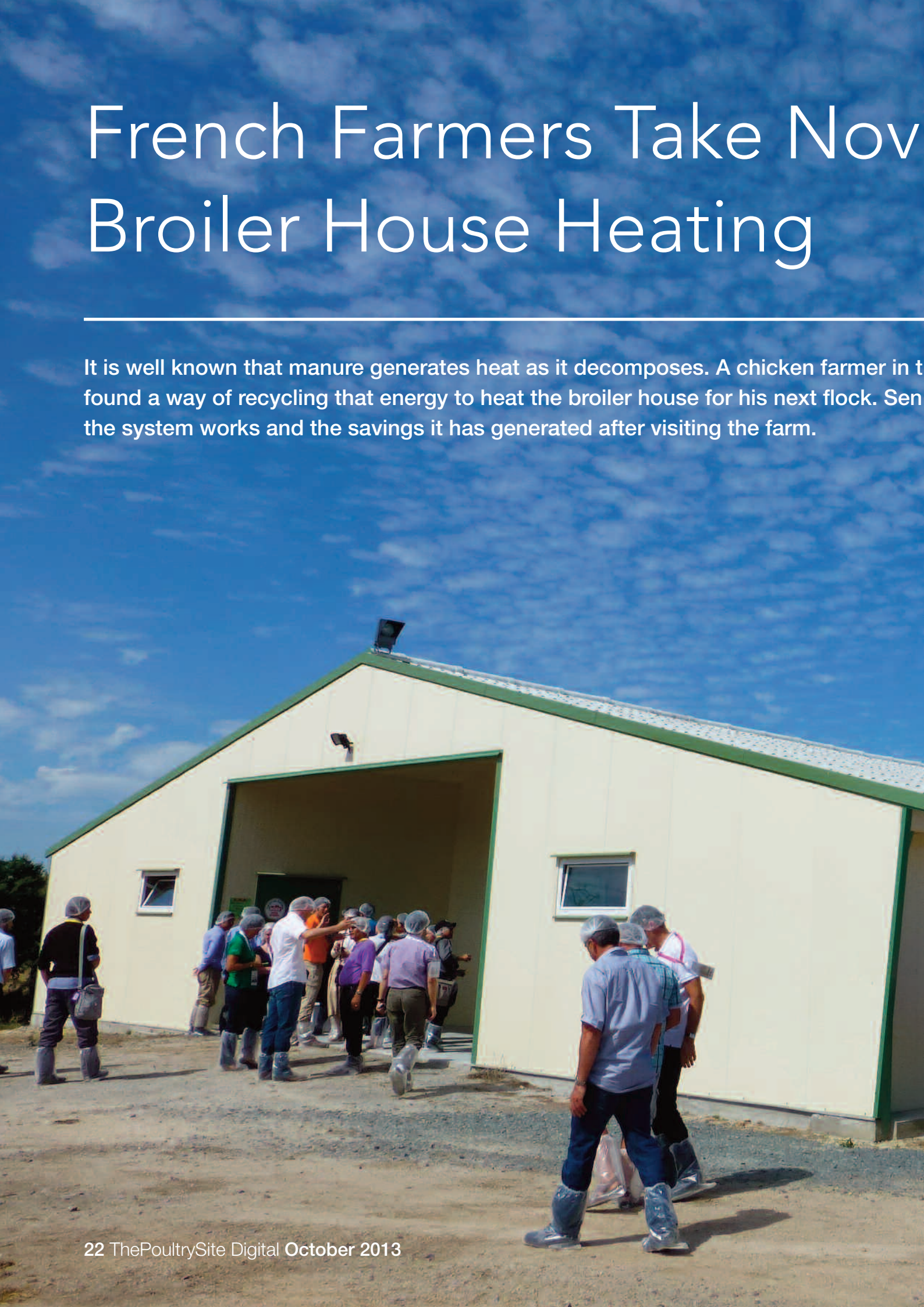
French Farmers Take Nov Broiler House Heating

It is well known that manure generates heat as it decomposes. A chicken farmer in t found a way of recycling that energy to heat the broiler house for his next flock. Sen the system works and the savings it has generated after visiting the farm.



el Approach to

he Loire Valley region of France has
ior editor, Jackie Linden, explains how

The farm's latest broiler house - well insulated and with the novel heat recovery system

Farm owners, Jean-Paul and Nadine Chupin

Jean-Paul and Nadine Chupin and their son, Nicolas, farm 94 hectares - mostly down to grazing and fodder crops for a beef herd of 110 Blonde d'Aquitaine suckler cows and their offspring - in the community of Torfou in the Maine-et-Loire department in western France. They also raise broilers on 3,400 square metres for Doux and destined for the whole-bird export market.

The poultry farm comprises three buildings - one (470 square metres) has tunnel ventilation; a second one covers 1,200 square metres and is a classic poultry house with roof exhaust.

The newest broiler house - the third one on the farm - covers 1,740 square metres and was built in 2012. It too has tunnel ventilation but it is has two unusual features; it was designed as a low-energy building with underfloor heating and the heat source is spent broiler compost.

Features of the Low-energy House

From the exterior, the building looks unremarkable, except for a small additional room, which houses the buffer tank, meters and secondary gas-condensing boiler. Built in 2012, the building's ceiling and walls are well insulated; the ceiling comprises 30-mm polyurethane panel with 200mm of glass wool insulation and the walls are 80mm-thick sandwich panels.

The floor comprises 12-cm thick concrete over the heating pipes. Water enters the house at between 35 and 45°C and run at about 250cm per second through the staggering 14km of pipework that runs under the house, finishing up at 30 to 35°C.

Composting System

The novel part of the whole enterprise is the heat recovery system, which has been running since January 2013. It is based on the composting of spent poultry manure, which takes place in a two-phase process in a neighbouring barn.

The first active phase lasts around six weeks and involves composting the manure - with or without green waste. It is an aerobic fermentation, which requires the material to be sufficiently moist - ideally 40 to 50 per cent dry matter - and to be regularly turned or subjected to forced ventilation. Microbial activity increases the temperature within the heap, which reaches 65 to 70°C within a few days. The heat from this process is 'captured' by a 13-km long network of water pipes that run within the walls and floor of the barn and lead finally to the broiler house via the boiler room.

Regulations require a minimum temperature of fermentation of 50°C for 42 days or 55°C for 15 days to ensure the end product is hygienic. Before fermentation is complete, however, a second active period of six weeks is required - for maturation - which allows the

Nicolas Chupin explains the composting process

compost to cool down, stabilise and become a good fertiliser.

Costs and Financing

The family invested around €30,000 in the project as well as a great deal of the labour for the construction. They took out a 10-year loan for a total of €322,000. Doux will contribute €25 per tonne of chicken for the first 40 batches. The total cost of the composting barn was €20,000.

The Benefits

Three complete batches of broilers have now been reared in the building. Based on that experience, the Chupin family are pleased with the results. The birds have performed at least as well as those in their other houses and there are signs that there are even fewer problems with foot pad lesions.

There is even distribution of the broilers across the house, which indicates that the conditions are constant over the floor area. And this was noticed even during a period of very cold weather at the start of the year, when the outside temperature dropped to minus 10°C.

Because there is no direct combustion in the building, the atmosphere in the building itself is more pleasant.

Furthermore, the concrete floor of the house is much easier to clean between batches, and residual heat in the floor helps to dry the cleaned house quicker.

Warming up the building for the next batch takes 48 hours, as it does for the older houses with radiant heaters.

Less litter is required to keep the birds com-

fortable than in the older, conventional houses. The family estimates they need just 500g per square metre in the new house.

Finally, the Chupin family commented that the new installation does require attention to detail in terms of its management and biosecurity and they are still learning how to get the best out of the system. There is, of course, additional work needed to maintain the composting process and ensure that the heat recovery system is functioning as well as possible.

However, the real benefits lie in the energy- and cost-saving features of the new building. The house uses at least 50 per cent less gas than the older houses, which represents a 26 per cent saving on the farm's total gas bill.

Even before the heat recovery system was installed, the new building generated an average of €1.11 per square metre and batch than the older, less well insulated buildings on the farm. Adding in the novel heating system has improved the margin over feed by a further €1.04 per square metre and batch so the overall economic advantage adds up to around €3,750 for each flock through the house. ■

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1: Results may vary according to animal application (broilers, layers, turkeys) and local farm conditions.

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Randox Leads the Way in Coccidostat Testing

UK - Randox Food Diagnostics leads the way with first comprehensive test for coccidostats in poultry meat and eggs.

Egg and poultry processors seeking a workable screening solution for coccidiostats will welcome Randox Food Diagnostics bringing the first multi-analyte screening test to market.

Coccidiosis is a parasitic disease with symptoms normally including bloody droppings, weight loss and mortality in young chickens. With the global appetite for poultry meat increasing by 50 per cent since 2000, the pressure on producers is ever increasing. That can lead to over-cramped conditions perfectly suited to the spread of coccidiosis amongst flocks.

To prevent infection, farmers administer prophylactic antiprotozoal coccidiostats in feed, increasing the chances of residues being retained in poultry meat or eggs. To reduce the risk of toxicity to consumers, regulatory authorities set Maximum Residue Limits recommending an appropriate withdrawal period prior to slaughter.

Mariclare McGarrity, Senior Customer Support Scientist said: “The key issue is the range of coccidiostat drugs utilised in the poultry industry. This leaves traditional single-analyte screening ELISA products unsuitable and inefficient.

"However, Randox’s ground-breaking Biochip Array Technology is optimised for multiplex testing, identifying up to 22 different analytes from a single sample. Therefore, it can detect and quantify the whole range of commonly-used coccidiostats throughout the global market.”

Aviagen - Biosecurity: Prevention is Better Than Cure

UK - When it comes to viral respiratory diseases such as Infectious bronchitis (IB) and Newcastle Disease (ND), prevention is better than cure, says the Aviagen Technical Transfer Team.

Whilst these key infections can be prevented by appropriate vaccination, the best defence against disease challenges to a flock are effective biosecurity measures.

Typically, disease is brought onto the farm by some sort of vector (rodents, wild birds. contaminated clothing/footwear). Humans can carry viruses and bacteria in their nose and hair; flies, rats and birds can carry bacteria and viruses around for weeks transmitting them between farms.

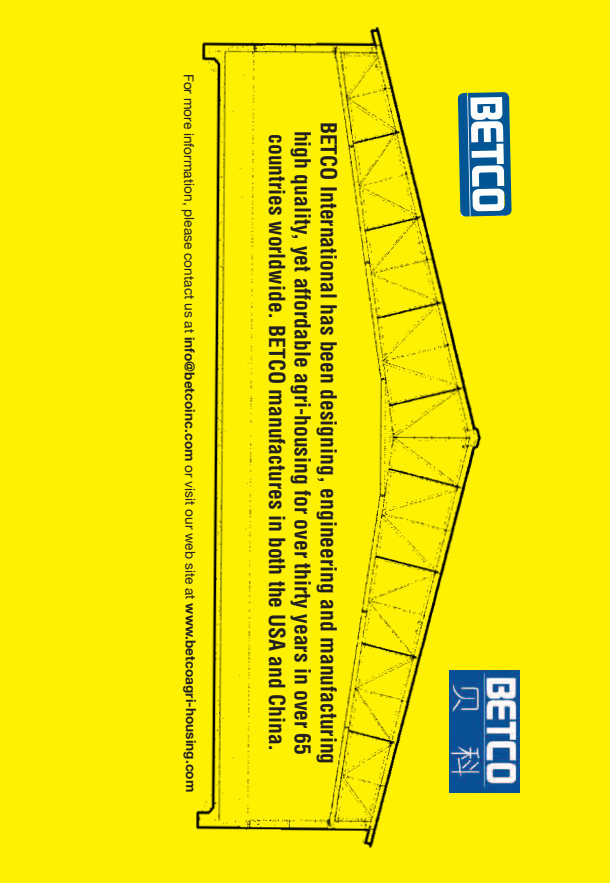
Adequate biosecurity will minimise disease transmission and will ensure minimal disease carryover between flocks.

- Prevent wild bird and rodent entry into house; check buildings, water supplies and feed storage facilities regularly for signs of wild birds or rodents.
- Introduce an adequate rodent/wild bird control programme and good waste disposal practices (for feed, dead birds and litter).
- Follow appropriate washing and disinfection procedures during clean-out.
- Clean, disinfect and store equipment away from the house between flocks.
- Provide showering facilities/clean clothing for personnel and visitors.
- Keep the farm clean and tidy so as to not attract wild birds, rodents and flies.
- Evaluate biosecurity procedures regularly.

BETCO Agri-housing: Important Exhibitor at the IPPE 2014

US - BETCO's International Division, now known as BETCO Agri-housing, will be a prominent exhibitor at the IPPE (International Production & Processing Expo) trade show in Atlanta, Georgia from 28 to 30 January 2014. IPPE is one of the 50 largest trade shows in the United States with more than 1,000 exhibitors.

BETCO Agri-housing has always had an importance presence at the Expo, featuring its pre-engineered poultry houses, serving the agricultural needs of poultry producers in



more than 65 countries worldwide.

The modular, BETCO-designed steel and lumber buildings incorporate structural flexibility for housing broilers, commercial laying hens and breeders. And they are compatible with any country's climate or geographical location, regardless of unpredictable weather or the threat of natural disasters.

Because BETCO is a single-source manufacturer, the company is in a position to customise structures to meet specific customer requirements.

Bottom line: BETCO buildings ensure a higher density of birds and a predictable number of days to achieve market weight. This means BETCO customers' return on investment is greatly increased over any locally constructed houses because they are more productive.

Agrilamp Beats Competitors in French Broiler Test

FRANCE - Arrive has tested Agrilamp 30w against its competitors in a head-to-head five-flock test.

Plasson Europe is Agrilamp's French Master distributor, supplying a host of local distributors and electrical contractors across France. When they asked Agrilamp if a head-to-head competition was a good idea, Agrilamp jumped at the chance.

After five consecutive flocks of Ross 308 birds, Agrilamp's Sales Director, John Matcham, arrived to see some of the results. Unfortunately, when he arrived, the birds had flown the coop! Outperforming its competitors, the birds with the Agrilamp had reached target weight and already left for the supermarket.

However, the best was yet to come. Consistently, the broiler barns had dry litter as the state of the dry concrete below was to demonstrate as the building was cleaned.

The Arrive farm manager commented: "The even distribution well above the required 20 lux kept the bird calm and content, growth performance was the same across all five flocks and the lower water intake certainly appears to help with the litter situation. We've placed orders for a number of new barns and have asked Agrilamp to provide retrofit solutions for our existing buildings."

Outright winner in the head-to-head, Agrilamp also had a successful 2013 SPACE exhibition in Rennes. While the France's Prime Minister may not have been the most popular

with French poultry farmers, Agrilamp was a huge success.

Official Opening of Pericoli Asia-Pacific Sdn Bhd

MALAYSIA - Termotecnica Pericoli has announced the official opening of its new manufacturing and distribution facility in Malaysia. This auspicious occasion is the culmination of a very clear vision for the Asian region, following many years of active sales in this region.

The appointment of a sales representative based in Malaysia in 2010 was followed by a Regional Office, which stimulated growth and demand for the company's products and service, justifying the need to establish this manufacturing, warehouse and distribution center. The company has always recognised the potential and importance of this large developing market.

This 2,300-square metre manufacturing area, warehouse and offices, including a 100-square metre showroom is the first external

or foreign manufacturing facility for Termotecnica Pericoli. The use of the most updated technology as applied in the Italian facility ensures the same high levels of Italian quality and performance through this new Asian facility as is currently available from Italy.

The primary focus will be on the production of the EOS/EWS and EOC fan lines. The facility will have capacity to increase the com-

pany's total global production capacity by 40 per cent.

It is worthy to note that it is the company's vision and goal is to operate with a combined team of Italian and local employees.

Report from AVEC in Valencia: Where Even the Paella Features Chicken

SPAIN - The 56th General Assembly of the Association of Poultry Processors and Poultry Trade in the EU (avec) was held in the splendid city of Valencia last week - an appropriate location as the local version of paella features chicken instead of the more usual seafood. Senior Editor, Jackie Linden, reports.

With nearly 130 participants representing 14 countries and a fine and varied programme of presentations, AVEC's annual General Assembly was hailed as a great success for the organising hosts, ProPollo.

The theme of the meeting, explained Federico Félix, was 'Continuing the success of poultry learning from research and practice'. Mr Félix is the President of ProPollo, the poultry meat association of Spain and also the current President of AVEC.

First up, delegates heard an analysis of the strengths and weaknesses, opportunities and threats ahead for European poultry meat producers, presented by Dr Laurence Bonafos of the European Commission DG AGRI. Later in the session and also representing the European Commission, Fabien Santini offered an overview of how the meat markets in general are modelled in the EU. Mr Santini is based at the Institute for Prospective Technological Studies, a joint Research Centre for

the European Union in Seville, Spain.

Representing the animal genetics sector, Dr Gerard Albers (President of the European Forum for Farm Animal Breeders, EFFAB), gave a very received presentation explaining how his sector responds to the known and expected demands of the poultry meat market.

Innovations to improve the efficiency and effectiveness of poultry processing were reviewed by the Director for Innovation for Poultry Processing with Marel Stork, Wim Beeftink.

Moving from technical to political challenges to the industry, Jim Sumner, President of the USA Poultry & Egg Export Council (USAPEEC) succeeded in explaining to the audience how both the North American and European poultry sectors can move ahead successfully in the future despite their differing views.

A successful future will certainly be based on sustainability in the industry, and WWF UK's Senior Food Policy Advisor, Duncan Williamson, explained that a more balanced Western diet would not only be more sustainable from the environmental point of view but also both cheaper and more healthy for consumers. To the evident relief of the AVEC audience, he did not advocate veganism or vegetarianism.

Last but but no means least in the formal part of the General Assembly, Juan Luis Durich explained the role of modern food distribution in today's chicken market in Spain. Mr Duric is General Manager and Chairman of Consum, a consumer co-operative based in Valencia.

US Health Reforms: How Do They Affect Farmers?

US - America's farmers have important decisions to make – both for their families and for their employees – with the Affordable Care Act, which came into effect on 1 October.

"On the whole, farmers are more likely to be insured than the rest of the US population," said Roberta Riportella, the Kansas Health Foundation's professor of Community Health at Kansas State University.

"This is not surprising given that farm work is hazardous with many potential occupational injuries. Purchasing health insurance and disability insurance is viewed by many farmers as essential elements in protecting their family farms."

The Affordable Care Act, also known as Obamacare, is now federal law that requires all

Americans to have health insurance. One provision of the law is set up as a 'marketplace' through which individuals can make decisions on what's best for them.

"Because premiums in the individual health insurance market are rated based on the individual's own risks, they have been exceptionally high for farmers," said Barbara O'Neill, an extension specialist in financial resource management at Rutgers University.

The new law, Ms O'Neill added, makes it more likely that "farm families will be able to purchase less expensive coverage."

A challenge for farmers, however, is that many will have to make insurance decisions for their families and their business.

Farms with less than 50 employees will not be required to provide insurance, and thus will not face government penalties, Ms O'Neill said.

But, she adds, "tax credits are available to help the smallest employers (less than 25 employees) pay for the cost of employee health insurance."

O'Neill added that a mandate for large farms (more than 50 employees) to provide health care coverage is currently delayed. So fines, which could be as much as $3,000 for every employee, will not be imposed until January 2015.

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China maquilará pollo para EUA

Estados Unidos aprobó cuatro plantas procesadoras chinas para que reciban pollo de EUA, Canadá o Chile, maquilarlo a través del procesamiento y exportarlo de nuevo a EUA.

El comercio avícola y agropecuario entre China y EUA estuvo en los titulares bastante en los últimos meses pero la aprobación de China para maquilar pollo para EUA pasó desapercibida. Hasta ahora: distintos grupos y políticos comenzaron a quejarse por la preocupación sobre la inocuidad alimentaria.

A principios del año, inspectores del USDA visitaron China para revisar su sistema de procesamiento de aves. La conclusión de la auditoría fue que el sistema chino de procesamiento es equivalente al de EUA.

La aprobación se anunció, en voz baja, a fines de agosto. El USDA estipula que los productos se etiquetarán sin mencionar el país de origen. La carne de pollo que usarán las plantas chinas procederá de los EUA, Canadá o Chile, los únicos países aprobados por el USDA.

Aunque se escucharon quejas inmediatamente, estas quejas han crecido significativamente recientemente. Cierto es que China tiene un pésimo historial cuando se habla de inocuidad alimentaria. Además, no hay forma de verificar si usarán en China el pollo que se les mandan para procesarlo.

Lea más aquí

César de Anda es el nuevo presidente de la Comisión Internacional del Huevo

César de Anda, presidente de Grupo Inova Alimentos, con sede en Tepatitlán, Jalisco (México), fue elegido como nuevo presidente de la Comisión Internacional del Huevo (del inglés, IEC) durante la Conferencia que se ha celebrado estos días en Ciudad del Cabo, Sudáfrica.

El empresario avícola mexicano César de Anda fue electo el día 26 de septiembre como nuevo presidente de la Comisión Internacional del Huevo, durante el evento anual que realiza el organismo en Ciudad del Cabo, Sudáfrica.

Lea más aquí

La avicultura colombiana frente a los Tratados de Libre Comercio

Según *El Tiempo*, las importaciones de carne de pollo, cerdo y res han crecido en 143%. Andrés Fernando Moncada, presidente de la Federación Nacional de Avicultores de Colombia (Fenavi), dijo que esto se debió a la dinámica introducida por el TLC con EUA. No obstante, los volúmenes fueron menores que los esperados: 24,138 toneladas de pollo, 15,121 de cerdo y solamente 232 de res.

Moncada, citado por El Colombiano indicó que "los americanos cambiaron la tendencia: antes solo consumían pechugas y alas pero ahora, con su crisis económica, se cambiaron a los perniles y muslos. Estos cuartos traseros pasaron de 0.30 centavos de dólar a 1.20 dólares por kilo y, la pechuga bajó de 7.50 y 8.0 dólares...

Lea más aquí

España: competencia ignora los pactos en precio del pollo

La Unión de Pequeños Agricultores y Ganaderos (UPA) de ha emitido un comunicado a través de su sitio web que denuncia la "dejadez" de la Comisión Nacional de Competencia ante el pacto sobre el precio a la baja del pollo entre los grandes distribuidores del país.

Según UPA, desde hace meses, compañías como Carrefour, Mercadona, Día, Lidl y Alcampo utilizan el pollo como producto reclamo, pactando su precio hasta casi un 20% por debajo de lo que cuesta producirlo. Para UPA estas prácticas están prohibidas por las normas de libre competencia y deben ser perseguidas y prohibidas.

La organización agraria UPA lleva semanas denunciando lo que comenzó como un “pacto oculto” de la gran distribución en relación con la carne de pollo.

Meses después, el precio de este producto sigue coincidiendo con exactitud en empresas como Carrefour, Mercadona y Alcampo, en estos momentos en los 2,20€/Kg.

UPA ha analizado la evolución de los precios y ha detectado que durante el mes de septiembre Carrefour, Alcampo y Mercadona han fijado el precio en 2,20 €/Kg, muy por debajo de los costes de producción (2,70 €/Kg) que el propio Ministerio de Agricultura estableció en un estudio del año 2010.

El precio de venta al público se sitúa un 18,5% por debajo de los costes de producción, lo que constituye una venta a pérdidas, “práctica anticompetitiva que debería ser perseguida”.

¿Entendemos correctamente lo que significa 'nacimientos de huevos fértiles'?

Una explicación clara de algunas de las formas de calcular la incubabilidad de Gerd de Lange de Pas Reform.

La incubabilidad se utiliza comúnmente para evaluar el rendimiento de incubación (y de la parvada de reproductoras). En otras palabras, el porcentaje de incubabilidad = (número de pollitos/número de huevos incubables) x 100. Sin embargo, las diferentes interpretaciones del "número de pollitos" y el "número de huevos incubables" pueden causar confusión en el cálculo del rendimiento de la incubadora.

Consideremos el siguiente ejemplo:

Un lote de 100 huevos para incubar produce 87 pollitos de un día de edad (ver tabla). La incubabilidad del conjunto de huevos es de (87/100) x 100 = 87.0%. Sin embargo, si uno de los 87 pollitos es de una calidad de segunda clase, es lógico basar el porcentaje de incubabilidad solo en los pollitos vendibles: (86/100) × 100 = 86.0%.

Evaluar el rendimiento real de la incubadora mediante el cálculo de la incubabilidad de los huevos fértiles ('nacimiento de huevos fértiles') es un método ampliamente aceptado. Esto tiene sentido, porque no hay habilidad, experiencia o tecnología que se pueda lograr incubar pollitos a partir de huevos estériles.

Volviendo al ejemplo: los huevos se pasaron por el ovoscopio antes de realizar la transferencia y se reconoció y eliminó a nueve 'claros'. No es raro que el cálculo de nacimientos de huevos fértiles se base en el número de huevos transferidos: (86/(100-9)) × 100 = 94.5%.

Es poco probable que los nueve huevos claros sean realmente infértiles – y realizar la rotura de los huevos claros establecerá la fertilidad real. Supongamos que de esos nueve huevos, cinco son infértiles y cuatro muestran embriones que murieron durante la primera semana de incubación. Esto hace que la fertilidad real sea del 95.0%.Por este método, el cálculo correcto de nacimientos de huevos

Conjunto de huevos	Claros			Pollitos de 1a. Clase	Pollitos de 2a. Clase	Total de pollitos
100	9			86	1	87
	Estéril	Muerte temprana	Muerte media			
	5	4	1			

fértiles no es del 94.5%, sino (86/(100-5)) × 100 = 90.5%: una diferencia muy significativa de cuatro por cierto, simplemente como resultado de una definición diferente de 'huevos fértiles'.

La pregunta es, ¿en qué método de cálculo se basa la norma generalmente aceptada para el buen rendimiento de incubación del 95% de nacimientos de huevos fértiles?

Cuando de manera incorrecta, los claros determinados a través del procedimiento estándar de ovoscopio son la base para el cálculo, es más fácil alcanzar esta norma. Sin embargo, en su mayoría los huevos claros son huevos fértiles que contienen un embrión muerto. Una mejor definición para el resultado de este cálculo es 'nacimientos de huevos transferidos'.

Los 'nacimientos de huevos transferidos' también dependen de la precisión del procedimiento de ovoscopio. Imagine que en el ejemplo anterior, con un procedimiento de ovoscopio preciso, se identifique un 'claro' adicional, una mortalidad a medio plazo. Los nacimientos de huevos transferidos se incrementan entonces en un uno por ciento a (86/(100-10) × 100 = 95.5%, aunque esto no signifique realmente que el rendimiento de la incubadora sea mejor.

Para alcanzar el 95% de "nacimientos de huevos fértiles (real)", deben eclosionar 90 pollitos vendibles del conjunto de 100 huevos, con cinco huevos infértiles y solo cinco huevos incubables que se podrían perder debido a una mortalidad embrionaria temprana, media y tardía.

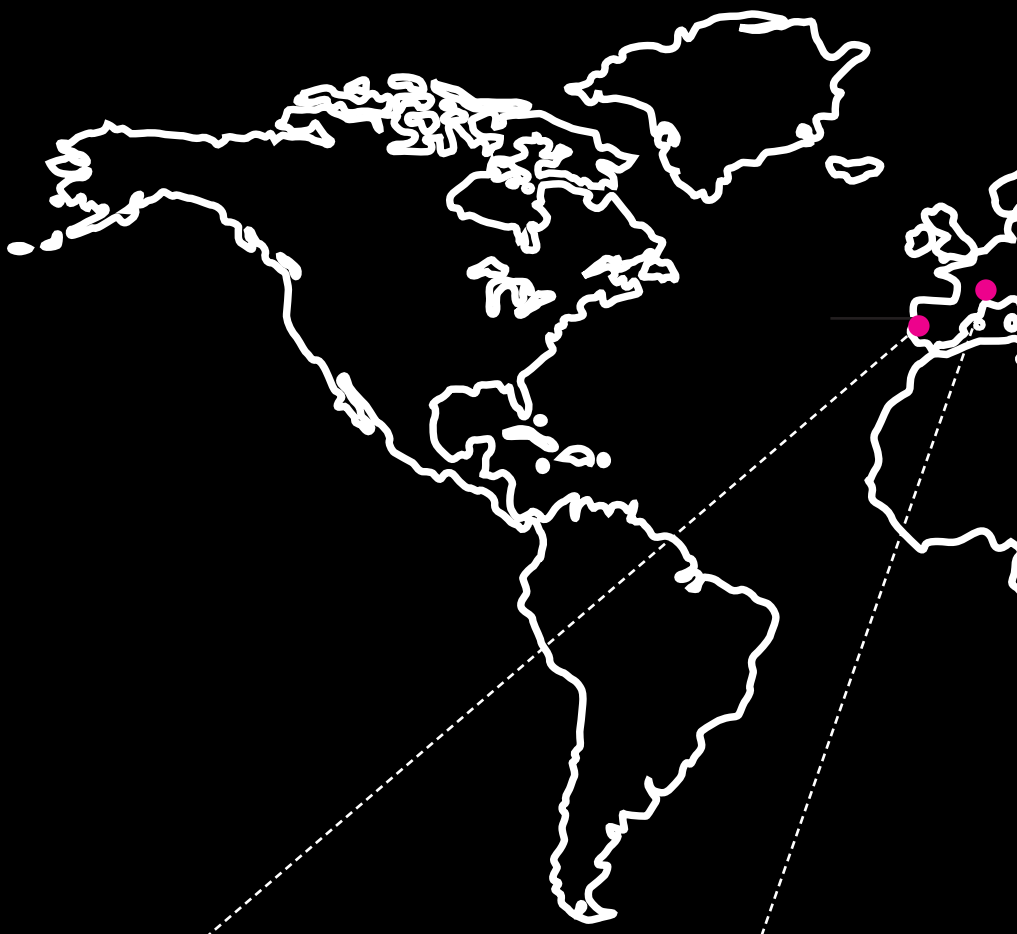
Nacimiento de huevos transferidos = (pollitos vendibles/número de huevos transferidos) x 100. Nacimiento de huevos fértiles = (pollitos vendibles/número de huevos fértiles) x 100

El cálculo de nacimientos de huevos fértiles en la práctica diaria de una incubadora es desafiante, y complicado debido a la necesidad de contar con procedimientos correctos para estimar con precisión la fertilidad real. Aplicar solo el procedimiento de ovoscopiado no es suficiente.

Los embriones que mueren durante los primeros días de incubación se contabilizan incorrectamente como huevos infértiles y la capacidad de los equipos de ovoscopiado para reconocer los huevos infértiles reales depende de la calibración precisa de los sensores y el software.

Se requiere de mucha mano de obra para obtener un número representativo de huevos incubables claros, que idealmente se obtiene durante un procedimiento de ovoscopiado a los 10 días. Sin embargo, esto proporciona la representación más exacta de la fertilidad y patrones reales de mortalidad embrionaria.■

Industry.**Events**



GMCC-13

Lisbon, Portugal, 12 - 15 November

The 6th International Conference on Co-existence between Genetically Modified (GM) and non-GM based agricultural Supply Chains (GMCC-13) is aimed at gathering academic and industry experts, regulators, policy makers and other key stakeholders from around the world to discuss both specific and comprehensive coexistence topics.

IPC Conference

Geneva, Switzerland, 10 - 12 October

Geneva will host IPC's second conference of 2013. Home of numerous international organizations, including WTO, and many agencies of the United Nations, including WHO, Geneva is truly a global city. The 2013 IPC conference will feature speakers from WTO, WHO and other international organizations.

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Poultry Tech Expo 2013
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