Laryngotracheitis control: epidemiological considerations

As we are approaching a century after avian infectious laryngotracheitis (ILT) was reported for the first time in Canada and the USA, this disease still persists in the poultry industry worldwide and continues to spread to susceptible poultry populations in countries where it has never been reported before (Peru: 2008; Ecuador: 2012; Turkey: 2013) or re-emerged after a long absence period (Brazil: from 1974 to 2002).

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Continuous cycle of infection

Avian infectious laryngotracheitis, an insidious respiratory viral infection of chickens, is present in major poultry producer countries of the world with variable cyclical occurrence, especially during the cold and dry seasonal periods of the year.

It is more persistent in areas with high poultry population densities combining different types of production, including multiage commercial layer operations where large populations of susceptible birds are exposed to the virus infection from already infected flocks.

Additionally, farms with different biosecurity practice levels, diverse management systems, continuous traffic of service vehicles visiting different farms and movement of birds and by-products within the area will establish a continuous cycle of laryngotracheitis virus (LTV) infection (Fig. 1).

Epidemiological factors

- **Type of production**

The production cycle in short-lived birds facilitates the control of ILT in comparison with long-lived birds (Table 1). Poultry industry trends will continue to shorten the production cycle for broilers and extend it for layers.

Short-lived birds	Long-lived birds
All in, all out flock management	Multiple age flocks in the same farm and exposure (Live LT vaccinated or field infected with susceptible)
Early processing	Endure ILT life carrier stage and virus intermittent shedding
Premises down time may be extended/ Thorough disinfection	Increased multiple biosecurity measures/ LT preventative vaccination (vector vaccines)/ Broader disinfection approaches

Table 1. Comparison of ILT control by the type of production.

- **Type of vaccine:**

Flocks vaccinated with conventional live LT vaccines or LTV field infected are intermittent shedders, spreading the disease with the risk of natural virus recombination and increased virulence after serial bird passages in large susceptible populations.

- **Location:**

High poultry population densities with diverse poultry production systems.

- **Environmental conditions:**

Certain environmental conditions are favourable for the dissemination of LTV, such as the winter season or dry-windy conditions.

- **Housing:**

Physiological stress factors (sexual maturity, heat stress, poor housing conditions, etc) reduce the bird resistance to infections.

- **Management:**

Placing large bird populations in reduced spaces; exposure to poor litter conditions; heat stress; poor ventilation, etc are stressing factors for the flock.

- **Mechanical vectors:**

People, equipment, insects, rodents, cats, dogs, wildlife.

- **Latency:**

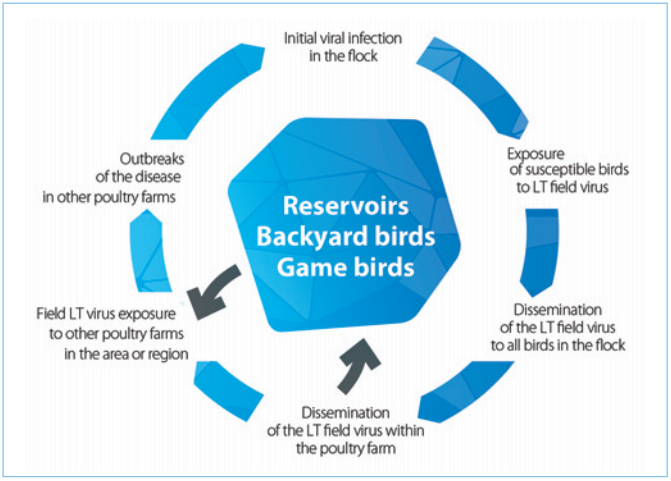
LTV infected birds are virus carriers for life and become latent reservoirs.

Biosecurity levels

Systematic combination of different biosecurity measures are needed to avoid the entrance of LTV into a susceptible flock and to minimise the risk of economic losses associated with the disease.

The economic impact of ILT in commercial poultry operations is variable and it is measured by the morbidity of the flock (up to 100%), mortality (up to 70%), sub-optimal production performance and drop in egg production, which may last for several weeks.

Fig. 1. Continuous ILTV infection cycle.



Preventative vaccination

Combined LT preventative immunisation programmes with the use of LT vectored vaccines rather

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Basic biosecurity measures

LEVEL 1

- Internal and external barriers
- Clean vs dirty separation areas
- Diversified and rotational disinfection
- Employees: clean clothing and boots
- Traffic control: equipment and vehicles
- Bird mobilisation: secure routes
- Drinking and feeding systems
- All-in/all-out vs continual placement
- Disposal systems (litter, mortality)
- Down time between flocks
- Insect and rodent control
- Education and training
- Records and SOPS

LEVEL 2

- Biosecurity self evaluation practices
- Biosecurity audits
- Biosecurity certification
- Risk assessment
- Open communication channels
- Managing live LT vaccinated vs vector vaccinated flocks
- Monitoring flock performance

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than emergency vaccination in the face of an outbreak as a long term approach for the reduction of LTV environmental load has distinctive advantages.

These vector vaccines applied at the hatchery or in the field or in combination, as a systematic practice, will diminish the risk of LTV infection and consequently the economic impact caused by the disease without spreading it. As the awareness of the negative consequences with the use of live conventional LT vaccines increases (CEO/TCO), the trend of using vector vaccines is gaining ground.

An important finding on the use of vector vaccines was presented in a recent survey on the types of ILT vaccines used in 104 countries showing that 74% of the countries use any kind of LT vaccine and 49% use a LT vector vaccine (Table 2).

Steps towards ILT control

- Strategic epidemiological surveillance
- Early detection and rapid diagnostic capabilities
- Transparency and open communication channels (GIS)
- Standard biosecurity procedures/Audited and certified
- Use of safer vaccines based on preventative programmes
- Continuing education and control campaigns
- Financial support allocated
- Contingency plan in place

Steps towards LT control

Control of ILT in highly prevalent areas requires integral control measures at farm and regional levels. There is increased evidence that the main source of ILT outbreaks is the use of live LT conventional vaccines.

Therapeutic vaccination (emergency vaccination in the face of outbreaks) may help to stop the outbreak on a farm, but favours the continuity of the LT infection cycle and will create a risk for neighbouring farms and the establishment of reservoirs that perpetuate the LT infection cycle.

Be prepared and protected

Infectious laryngotracheitis continues to be a threat to the poultry industry. Combined systematic biosecurity measures with preventative vaccination programmes using safer vaccines is a more solid proactive approach, rather than waiting for LT outbreaks to happen and then applying an emergency treatment that can spread the disease.

These integral control measures adopted by the poultry industry at a regional level will be more effective in the long term than implementing control practices by well-intentioned isolated companies. ■

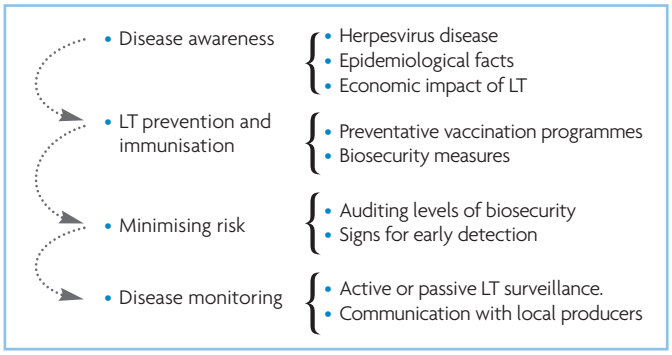

Fig. 2. Steps towards LT prevention.

References are available from the author on request

Table 2. Geographic survey of 104 countries using LT vaccines.

Type of LT vaccine used	Countries (No.)	Use (%)
LT vaccine use (any kind)	77	74
CEO	61	59
TCO	24	23
LT Vector (at least 1 or both)	51	49
rHVT-LT	44	42
rFPV-LT	32	31
Killed	3	3