

TECHNICAL SUMMARY

Marek's Disease

November 2013

MANAGING MAREK'S TO HELP PROTECT YOUR MOST VALUABLE BIRDS

Marek's disease virus (MDV) continues to present a formidable challenge to flock health managers raising long-lived commercial chickens. Each year, worldwide losses from MDV exceed \$1 billion.¹ Over the decades, the virus has continued to evolve into ever more virulent strains, thus imperiling the industry across the world.¹ This has extended to valuable, long-lived birds.

The condemnation rate for unvaccinated flocks in high-challenge areas averages more than 10% and has even exceeded 50% in some cases.² The disease causes tumors in various organs, such as the spleen, liver, lungs and kidneys. Disease symptoms include neurological disorders, such as partial paralysis in the bird's legs or wings.¹

Infected birds carry the virus in their blood for an extended period and remain a source of infection for susceptible birds.² The virus is shed in feathers, which can retain infectivity for four to eight months at room temperature.³

Because the virus persists in chickens, is efficiently transmitted and is stable in the environment, eradication of MDV under modern poultry management practices is not feasible.² Since chicks usually are exposed shortly after placement, it is important to employ a vaccination strategy appropriately suited to help protect your most valued chickens.

KEY POINTS

- The condemnation rate for flocks without Marek's vaccination in high-challenge areas is an average of 12% and in excess of 50% in some cases.²
- Long-lived birds protected with low-passage Marek's vaccines have been demonstrated to have significantly lower mortality rates compared with birds vaccinated with high-passage Marek's vaccines.⁴
- Birds vaccinated with low-passage Marek's vaccines have been demonstrated to produce greater weight gain at 21 days.⁵





CHOOSING BETWEEN HIGH- AND LOW-PASSAGE VACCINES

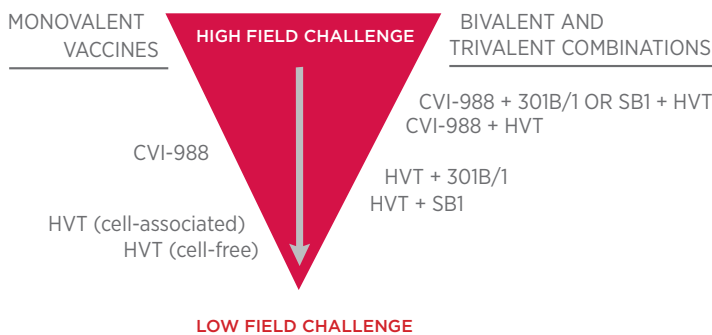
MDV vaccines aim to help prevent the mortality, sickness and immunosuppression associated with the neural, visceral, ocular and cutaneous forms of Marek’s disease, helping protect your most valuable birds.³

MDV vaccines can differ by their passage level, or their level of adaptation to growing in cell culture. Lower-passage vaccines — especially CVI-988 — generally help provide the highest levels of protection against Marek’s disease for both low and high challenges.⁴

Vaccine strain choice for use in layers and breeders is based on the virulence of the local field challenge, degree of contamination and time of exposure to the field virus (see table below).

As the passage level increases, plaque size also increases. Larger plaque sizes indicate a higher level of attenuation, which correlates with slower onset of immunity and a lower protective index.⁴ Lower-passage vaccines, comparatively, tend to replicate faster, leading to rapid onset of protection.

Lower-passage vaccines have demonstrated better spreadability and bird-to-bird shedding, helping diminish the field virus challenge of this contagious disease.⁴ Lower-passage vaccines also feature more persistent viremia, leading to sustained protection throughout your flock.



STUDY: PROTECTION DIFFERENCES NOTED BETWEEN FOUR COMMERCIAL CVI-988 VACCINES

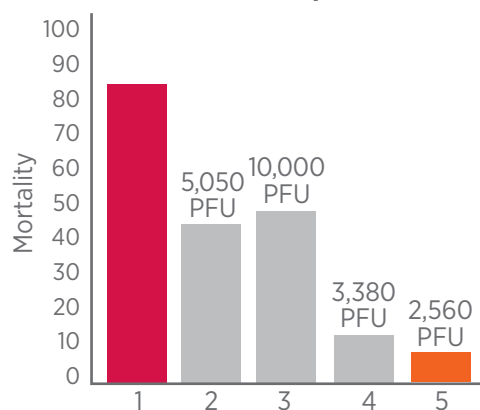
Like Marek’s herpesvirus of turkey (HVT) vaccines, lower-passage Rispens vaccines have been demonstrated to be more protective even in the case of having a lower release titer.⁴

A leading U.S. poultry breeding company studied mortality of 200 long-lived birds.⁴ Chicks were vaccinated at hatch subcutaneously with recommended field doses of commercial vaccines containing the CVI-988 strain. Both vaccinated and unvaccinated chicks were held overnight in the laboratory before being challenged at two days in a brooder facility that contained older seeder chickens inoculated with vv+MDV strain 686. Mortality due to Marek’s tumors was confirmed and tabulated at the end of study (17 ½ weeks).

RESULTS

Both groups administered lower-passage vaccines had lower mortality rates than both groups administered higher-passage vaccines. The group administered Poulvac® Ovoline CVI-988 from Zoetis produced the lowest mortality rate of all treatment groups.

Mortality rates at 16 to 18 weeks: High- vs. low-passage Marek’s Rispens vaccines⁴



KEY

1. Unvaccinated, infected control
- 2., 3. Birds placed on commercial high-passage vaccines
4. Birds placed on commercial low-passage vaccine
5. Birds placed on Poulvac Ovoline CVI-988 from Zoetis



MEASURING WEIGHT GAIN, PROTECTION LEVELS BETWEEN MAREK'S RISPENS-VACCINATED BIRDS

A recent study measured the efficacy of Poulvac Ovoline CVI-988 from Zoetis versus a commercial competitor by comparing weight gain and Marek's tumor protection levels.⁵ Two different doses were administered: 2,000 PFU and 4,000 PFU.

The 2,000 PFU group was studied for possible titer losses resulting from vaccination technique. About a 50% titer decay was observed in a previous study due to vaccine room temperature, time between preparation and application, and administration of other products, including other non-Marek's vaccines and antibiotics.⁵

RESULTS

Birds vaccinated with Poulvac Ovoline CVI-988 demonstrated greater body weight at 21 days and greater protection levels against Marek's disease tumors at 51 days.

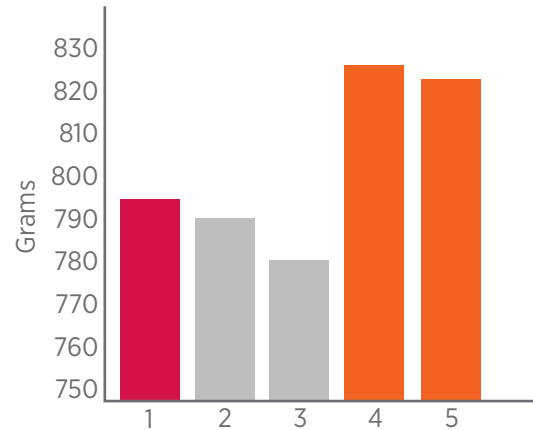
At day 21, chickens vaccinated with Poulvac Ovoline CVI-988 (both 2,000 PFU and 4,000 PFU) weighed more than chickens receiving the competitor's vaccine and the control group. These birds were placed in contact with seeder birds previously challenged with vv+MDV 648A.

At 51 days of age, birds vaccinated with Poulvac Ovoline CVI-988 (both 2,000 PFU and 4,000 PFU) demonstrated greater protection levels against MDV tumors.

*The minimum release titer for CVI is 1,000 PFU per dose.**

*U.S. Code for Federal Regulations. Title 9: Animals and Animal Products. Part 113:330: Marek's Disease Vaccines. Potency test 3 (ii). 2014:823.

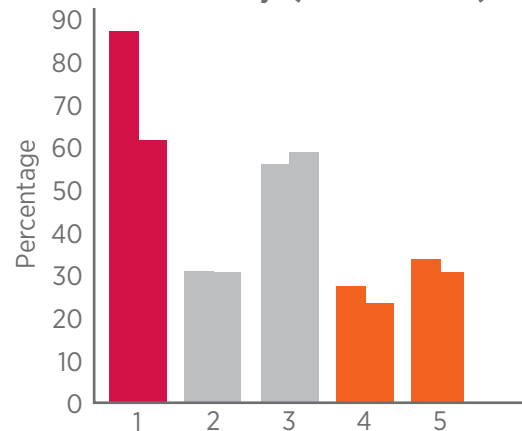
Body Weight at 21 days (g)⁵



KEY

1. Unvaccinated control
2. CVI-988 commercial competitor 2,000 PFU
3. CVI-988 commercial competitor 4,000 PFU
4. Poulvac Ovoline CVI-988 2,000 PFU
5. Poulvac Ovoline CVI-988 4,000 PFU

Percentage of Marek's-positive birds at 51 days (Genetic 1 and 2)⁵



KEY

1. Unvaccinated control
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4. Poulvac Ovoline CVI-988 2,000 PFU
5. Poulvac Ovoline CVI-988 4,000 PFU



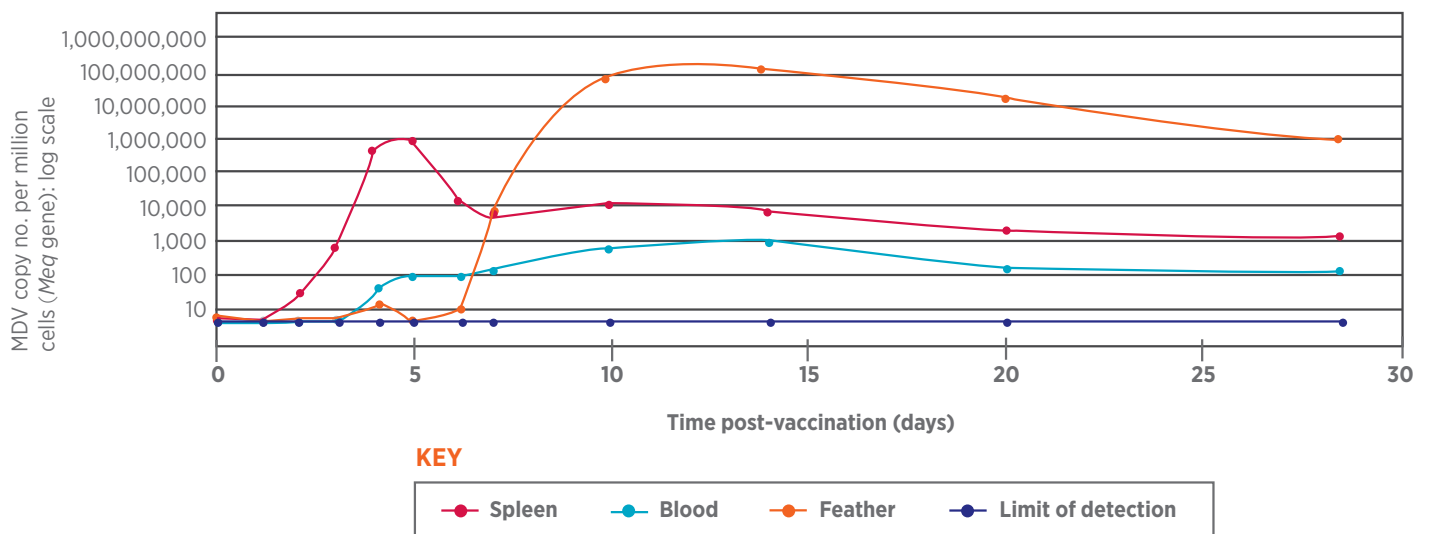
SERVICES AND SUPPORT EXTEND TO PCR TESTING

Within your Marek's management program, Zoetis also offers polymerase chain reaction (PCR) testing diagnostic services to measure and monitor vaccine efficacy, helping detect subclinical MDV and improve vaccination quality.

PCR testing measures the presence and replication of the *Meq* gene, specific for serotype 1 MDV — common to field viruses and the Rispens vaccine strains.

One study from Zoetis concluded that PCR testing allows for detection of serotype 1 MDV by quantifying the amount of genome in the feather follicles.⁶ As the corresponding graphic demonstrates, feather pulp taken between days 10 to 25 is the optimum period to measure virus replication for analyzing vaccine intake in broilers and broiler breeder birds. Thus, Zoetis PCR allows flock health managers to build the right MDV vaccination program given their environmental challenge and confirm that their birds are responding properly to it.

Poulvac Rispens replication in various tissues after day-of-age vaccination⁶



Beyond high-quality vaccines and hatchery technical support, Zoetis works to understand how Marek's disease vaccination fits into your overall flock health goals for managing your most valuable birds. We are here so your focus is where it needs to be.

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¹ The Poultry Site. Marek's disease. Available at:

<http://www.thepoultrysite.com/diseaseinfo/90/mareks-disease>. Accessed Aug. 28, 2013.

² Baigent SJ, Smith LP, Currie RJW and Nair KV. Correlation of Marek's disease herpesvirus vaccine virus genome load in feather tips with protection, using an experimental challenge model. *Avian Pathol* 2007;36(6):467-474.

³ Witter RL, Burgoyne GH and Burmester BR. Survival of Marek's disease agent in litter and droppings. *Avian Dis* 1968;12(3):522-530.

⁴ Witter RL and Kreager KS. Serotype 1 viruses modified by backpassage or insertional mutagenesis:

Approaching the threshold of vaccine efficacy in Marek's disease. *Avian Dis* 2004;48(4):768-782.

⁵ Data on file, Study Report No. 05-11-70AQ0, Zoetis Inc.

⁶ Baigent S, Smith LP, Nair VK and Currie RJW. Vaccinal control of Marek's disease: Current challenges, and future strategies to maximize protection. *Vet Immunol Immunopathol* 2006;112:78-86.