

## Vira Shield® 6

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus**

## Product Numbers

### Vira Shield® 6

383 - 50 mL - 10 doses  
384 - 250 mL - 50 doses

## Vira Shield® 6 + Somnus

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus-Haemophilus Somnus Bacterin**

### Vira Shield® 6 + Somnus

385 - 50 mL - 10 doses  
386 - 250 mL - 50 doses

## Vira Shield® 6 + L5

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus-Leptospira Canicola-Grippotyphosa-Hardjo-Icterohaemorrhagiae-Pomona Bacterin**

### Vira Shield® 6 + L5

294 - 50 mL - 10 doses  
297 - 250 mL - 50 doses

## Vira Shield® 6 + L5 Somnus

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus-Haemophilus Somnus-Leptospira Canicola-Grippotyphosa-Hardjo-Icterohaemorrhagiae-Pomona Bacterin**

### Vira Shield® 6 + L5 Somnus

302 - 50 mL - 10 doses  
304 - 250 mL - 50 doses

## Vira Shield® 6 + VL5

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus-Campylobacter Fetus-Leptospira Canicola-Grippotyphosa-Hardjo-Icterohaemorrhagiae-Pomona Bacterin**

### Vira Shield® 6 + VL5

307 - 50 mL - 10 doses  
312 - 250 mL - 50 doses

## Vira Shield® 6 + VL5 Somnus

**Bovine Rhinotracheitis-Virus Diarrhea-Parainfluenza 3-Respiratory Syncytial Virus Vaccine, Killed Virus-Campylobacter Fetus-Haemophilus Somnus-Leptospira Canicola-Grippotyphosa-Hardjo-Icterohaemorrhagiae-Pomona Bacterin**

### Vira Shield® 6 + VL5 Somnus

340 - 50 mL - 10 doses  
350 - 250 mL - 50 doses

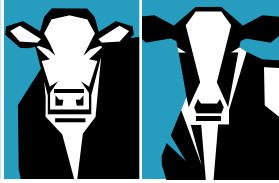
- **First with 3-way BVD protection** — Vira Shield 6 vaccines contain noncytopathic (NCP) Type 1, NCP Type 2 and cytopathic (CP) Type 1.
- **Long-lasting protection** — Research demonstrates that the Type 2 BVD protection of Vira Shield remains strong 11 months after vaccinating<sup>1</sup>. Xtend® SP adjuvant gives prolonged stimulation of the immune system.
- **Convenient** — Numerous ready-to-use combinations so you get more done with each.
- **Protection for the whole herd** — Vira Shield 6 is safe for any animal in the herd regardless of previous vaccination history, including pregnant cows and calves nursing pregnant cows.
- **Able to overcome maternal antibodies** — Vaccine shown to prime the immune systems of young calves even in the face of antibodies from cows' colostrum.
- **Powerful vibrio protection** — The only leading inactivated vaccine that offers Type 2 BVD and *Campylobacter fetus* protection in simple and effective combinations for cows and bulls.



**Customer Service**  
**(800) 843-3386**

[www.livestock.novartis.com](http://www.livestock.novartis.com)

©2005 Novartis Animal Health US, Inc.  
Vira Shield and Xtend are registered trademarks of Novartis AG.  
BVD Shield is a trademark of Novartis AG.  
Triangle is a registered trademark of Wyeth.  
Elite 4 is a trademark of Boehringer Ingelheim Vetmedica Inc.  
APR05, 152624-4514295



# Technical disease information

## Bovine Virus Diarrhea (BVD)

BVD virus is one of the most prevalent and challenging bovine viral pathogens in the world. There are literally hundreds of BVD viral strains, and the number continues to increase due to the mutating nature of the virus.

The BVD virus suppresses the immune system, which leads to secondary infections from other pathogens. The virus manifests itself in numerous ways including:

- Bovine respiratory disease
- Hemorrhagic (bleeding) syndrome
- Reproductive disorders, including infertility, abortion and neonatal defects
- Persistently infected (PI) calves that shed enormous amounts of infective virus throughout their lives
- Gastrointestinal disorders
- Mucosal disease in persistently infected calves

BVD viral strains fall into two genotype categories - BVD Type 1 and BVD Type 2. BVD viral strains are further classified according to biotype. They can be cytopathic (CP) or noncytopathic (NCP). Researchers have determined that NCP BVD is the more prevalent biotype. In fact, NCP biotypes have been found to cause up to 95 percent of BVD outbreaks.<sup>2</sup>

**Vira Shield** is the only product line to feature 3-way BVD protection. All **Vira Shield 6** combinations contain NCP Type 1 and NCP Type 2, as well as CP Type 1. A recent study shows that adding a third BVD strain improves immune responses against these biotypes and genotypes. **See Figure 1.**

**Figure 1: Immune response measured via titers 28 days post-second vaccination.**

	CP Type 1	NCP Type 1	NCP Type 2
<b>Vira Shield® 2</b> (with 2-way BVD)	<b>1:394</b>	<b>1:38</b>	<b>1:72</b>
<b>New BVD Shield™ 3</b> (with 3-way BVD)	<b>1:508</b>	<b>1:77</b>	<b>1:236</b>

### Long-lasting Type 2 immunity

A study conducted at South Dakota State University's Departments of Veterinary Science and Biology/Microbiology demonstrated the value of the right antigens and adjuvant via a duration of immunity study involving **Vira Shield**.<sup>1</sup>

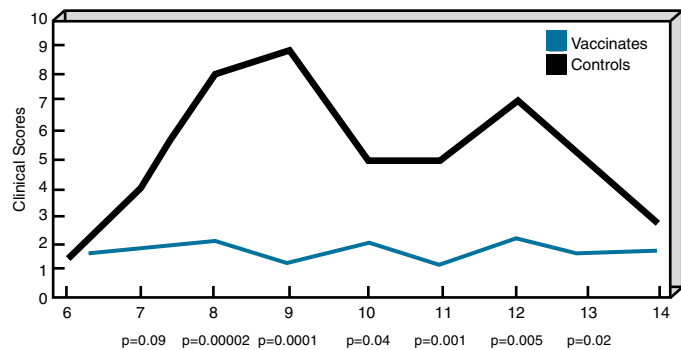
### Trial protocol:

- 500- to 750-lb. calves were vaccinated with two doses of **Vira Shield 5**, 30 days apart.
- Animals were challenged 11 months post-vaccination with Type 2 BVD (Strain 890), which is a different strain from the Type 2 isolate in **Vira Shield**.
- Cattle were given a clinical score based on severity of respiratory signs (10 = poorest score).

### Trial Results - See Figure 2:

Cattle vaccinated with **Vira Shield** showed significantly lower clinical scores compared to non-vaccinated animals on days 8 through 13 post-challenge. The authors concluded that vaccination with a properly administered inactivated vaccine can result in protection of cattle from challenge with Type 2 BVD for up to a year after vaccination.

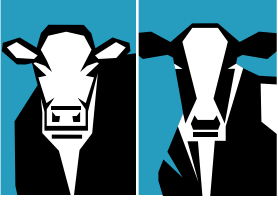
**Figure 2: Respiratory clinical scores following BVDV challenge**



### Infectious Bovine Rhinotracheitis (IBR)

IBR, sometimes referred to as “red nose,” is caused by Bovine Herpesvirus 1. Prior to the advent of large feedlots and dairy complexes, the primary manifestation of IBR was in a reproductive form called IPV (infectious pustular vulvovaginitis). Today, the IBR virus is associated with:

- Upper respiratory tract infections
- Bovine respiratory disease
- Eye disorders like conjunctivitis
- Reproductive disorders, such as IPV, abortion and neonatal death



### Parainfluenza 3 (PI<sub>3</sub>)

Parainfluenza 3 is in the same family as bovine respiratory syncytial virus (BRSV) and has been isolated, identified and studied in relation to bovine respiratory disease syndrome (BRD). PI<sub>3</sub> virus is commonly isolated from animals suffering from BRD, although it appears to be more of a contributing agent, rather than a primary pathogen. By itself, PI<sub>3</sub> virus usually produces a rather benign infection of the lungs. It most commonly invades the lungs, causing an inflammation of the membranes that envelope the lungs, resulting in mild pneumonia.

### Bovine Respiratory Syncytial Virus (BRSV)

BRSV was first isolated in the United States in 1974 and has been identified as a major contributing agent in the BRD syndrome. It was named BRSV because it promotes the formation of large masses of cells called syncytial cells in the epithelium and narrow spaces of the lung.

An initial exposure to the virus usually produces a mild subclinical infection, which occurs approximately five days after stress and exposure. Within two to 10 days after recovery from this primary infection, some animals will exhibit a severe clinical form of the disease, which if untreated will last 12 to 14 days and result in a high percentage of deaths. At any of these stages, the course and severity of the disease can be aggravated by invasion of the weakened animals with other viral and bacterial pathogens.

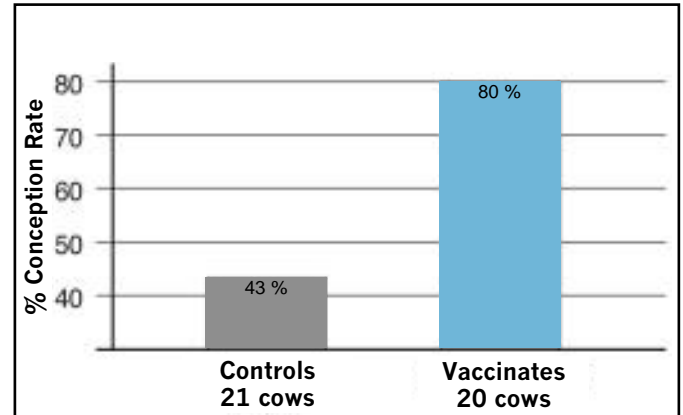
### Campylobacteriosis

Bovine genital campylobacteriosis, previously known as vibriosis, is a venereal disease of cattle caused by *Campylobacter fetus*. This disease is spread from bull to cow and cow to bull during breeding. It can also be spread through artificial insemination if pipettes or semen are contaminated.

Infection with *Campylobacter* is subclinical and restricted to the reproductive mucous membranes of breeding bulls and cows. Uterine infections usually destroy the embryo at its earliest stages. However, in some instances the embryo survives, becomes infected and is aborted in the second trimester of pregnancy. The presence of the disease should be suspected when conception rates for a herd drop below 90 percent. Definite diagnosis can be made by identifying the organism in the mucus from the cow's reproductive tract or in preputial fluid from the infected bull.

Research shows that vaccination with the vibrio component of **Vira Shield 6 + VL5** can significantly improve conception rates. **See Figure 3.**

**Figure 3: Results from *Campylobacter fetus* (Vibrio) challenge study**



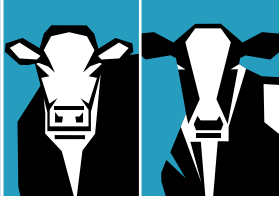
In a severe pre-breeding challenge, nearly twice as many cows became pregnant in the vaccinated group as shown in **Figure 3**. These animals were challenged with two different strains of *Campylobacter fetus*. This demonstrates protection against varied challenges like those most likely to occur in your herd.

### Leptospirosis

Due to better and more utilized diagnostics, leptospirosis is gaining renewed notoriety as a reproductive pathogen. The most significant serovars of leptospirosis associated with reproductive problems in U.S. cattle include *Lepto. pomona* and the *hardjo* serovar. *Hardjo* is further classified as *Leptospira interrogans* serovar *hardjo* (type: *hardjo-prajitno*) or *Leptospira borgpetersenii* serovar *hardjo* (type: *hardjo-bovis*). Clinical signs can include infertility, abortion of fetuses at four months or older, and weak calves at birth. Low rates of abortion that often go unnoticed are seen with the *hardjo* serovars. High abortion rates of 50 percent or more are sometimes seen when *Lepto. pomona* hits in the last trimester of gestation.<sup>3</sup>

### *Haemophilus somnus*

*Haemophilus somnus* is a major cause of death in calves due to encephalitis (brain infection). It also causes pneumonia, arthritis and myocarditis (heart muscle infections). Occasionally it is a cause of reproductive problems in the breeding herd. *H. somnus* infections occur most commonly in stress situations, such as when cattle are closely grouped together (e.g. sale barns or drylots).



Disease usually occurs one week to one month after cattle are grouped together. Some cattle will show signs of encephalitis, including blindness, staggering and convulsions. Without proper antibiotic treatment, most of these animals will die. Brain damage caused by *H. somnus* is irreversible, so even if the animal is treated and survives, it may have to be culled. Other cattle will develop pneumonia, which is indistinguishable from viral and other bacterial pneumonias. Thus *H. somnus* pneumonia can be easily misdiagnosed.

**Haemophilus somnus challenge study**

Non-vaccinated calves challenged with *H. somnus* showed considerable death loss compared to calves vaccinated with **Vira Shield 5 + Somnus**.

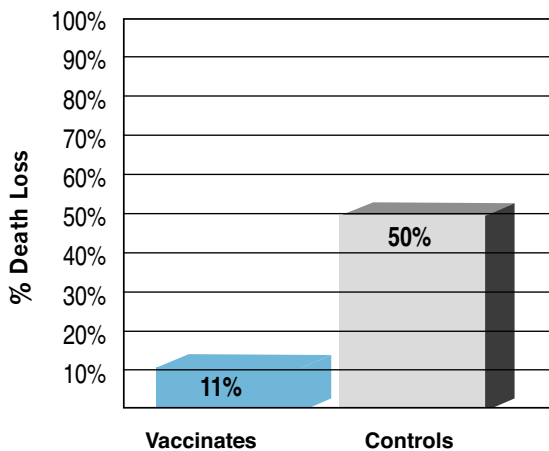
**Trial protocol:**

- Calves weighing 350-500 lbs. were vaccinated with two doses of **Vira Shield 5 + Somnus** 28 days apart.
- Calves were challenged with *H. somnus* 14 days after the second vaccination.
- Calves were observed twice daily for 14 days post-challenge and given clinical scores based on central nervous system signs, depression, lameness, and death.

**Trial Results - See Figure 4:**

Eighty-nine percent of the vaccinates survived a challenge that killed 50 percent of the control calves.

**Figure 4: Results of *H. somnus* challenge study**



**Vira Shield for pre-weaned calves**

Research shows that calves do best when immunity-building begins early in life. However, maternal antibodies passed to young calves via colostrum can “tie up” the immunity-building process. In an Iowa State University study, the immune response of 120 young calves with residual maternal antibodies was measured after calves were vaccinated.<sup>4</sup>

**Trial protocol:**

Four groups of 30 animals each were handled as follows on day 0 and day 32:

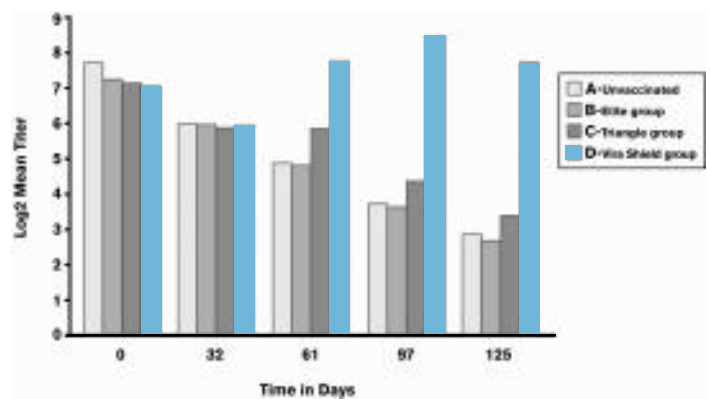
- Group A: Control/no vaccine
- Group B: Elite 4™ vaccine
- Group C: Triangle® 4 vaccine
- Group D: **Vira Shield 5** vaccine

Blood samples were collected on days 0, 32, 61, 97 and 125. Antibody titers were determined by standard microtiter serum neutralization tests.

**Trial Results - See Figure 5:**

Over time, the **Vira Shield** group showed superior antibody levels, particularly following the booster dose given on day 32. Calves given **Vira Shield** were able to overcome maternal antibody and thus begin building immunity well before the stress of weaning.

**Figure 5: Responses to vaccination by calves with high maternal antibodies**



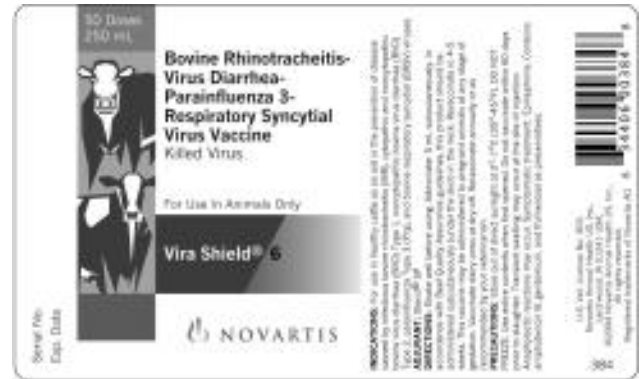


## Vira Shield® 6

**ADJUVANT:** Xtend® SP

**DIRECTIONS:** Shake well before using. Administer 5 mL subcutaneously. In accordance with Beef Quality Assurance guidelines, this product should be administered subcutaneously (under the skin) in the neck. Revaccinate in 4-5 weeks. This vaccine may be administered to pregnant animals at any stage of gestation. Vaccinate dairy cows at dry-off. Revaccinate annually or as recommended by your veterinarian.

**PRECAUTIONS:** Store out of direct sunlight at 2°-7° C (35°-45° F). DO NOT FREEZE. Use entire contents when first opened. Do not vaccinate within 60 days prior to slaughter. Transient swelling may occur at the site of injection. Anaphylactic reactions may occur. Symptomatic treatment: Epinephrine. Contains amphotericin B, gentamicin and thimerosal as preservatives.

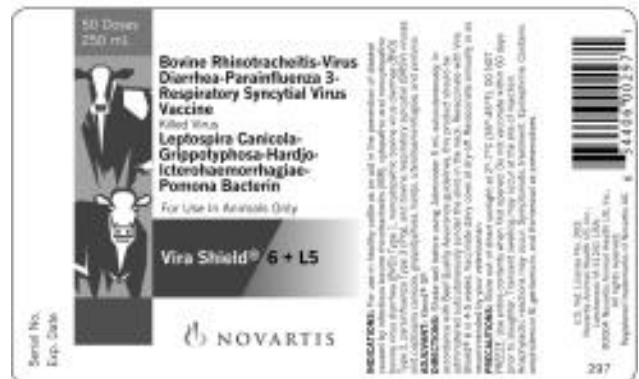


## Vira Shield® 6 + L5

**ADJUVANT:** Xtend® SP

**DIRECTIONS:** Shake well before using. Administer 5 mL subcutaneously. In accordance with Beef Quality Assurance guidelines, this product should be administered subcutaneously (under the skin) in the neck. Revaccinate with **Vira Shield® 6** in 4-5 weeks. Vaccinate dairy cows at dry-off. Revaccinate annually or as recommended by your veterinarian.

**PRECAUTIONS:** Store out of direct sunlight at 2°-7° C (35°-45° F). DO NOT FREEZE. Use entire contents when first opened. Do not vaccinate within 60 days prior to slaughter. Transient swelling may occur at the site of injection. Anaphylactic reactions may occur. Symptomatic treatment: Epinephrine. Contains amphotericin B, gentamicin and thimerosal as preservatives.



## Vira Shield® 6 + VL5

**ADJUVANT:** Xtend® SP

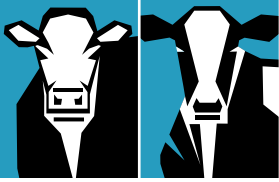
**DIRECTIONS:** Shake well before using. Administer 5 mL subcutaneously 2-4 weeks prior to breeding. In accordance with Beef Quality Assurance guidelines, this product should be administered subcutaneously (under the skin) in the neck. Revaccinate with **Vira Shield® 6** in 4-5 weeks. Revaccinate annually or as recommended by your veterinarian.

**PRECAUTIONS:** Store out of direct sunlight at 2°-7° C (35°-45° F). DO NOT FREEZE. Use entire contents when first opened. Do not vaccinate within 60 days prior to slaughter. Transient swelling may occur at the site of injection. Milk reduction and transient depression may be observed in lactating dairy cows for 3-6 days following vaccination. Anaphylactic reactions may occur. Symptomatic treatment: Epinephrine. Contains amphotericin B, gentamicin and thimerosal as preservatives.



## Haemophilus somnus:

The **Vira Shield 6** product line offers three additional formulations with protection against diseases caused by *Haemophilus somnus*, including **Vira Shield 6 + Somnus**, **Vira Shield 6 + L5 Somnus**, and **Vira Shield 6 + VL5 Somnus**.



- 
1. Chase C. Protection with an inactivated vaccine against IBR, BRSV and BVDV. Paper presented at: Annual Meeting of the American Association of Bovine Practitioners. 1995; San Antonio, Texas. Vira Shield has no approved claim for duration of immunity for Type 2 BVD.
  2. Chase CCL. Department of Veterinary Science, South Dakota State University, Brookings, SD.
  3. Anderson M. Diagnosis of infectious causes of bovine abortion. 37<sup>th</sup> Annual Convention Proceedings of American Association of Bovine Practitioners. 2004;90-94.
  4. Kaeberle M. Antibody responses of young calves to inactivated viral vaccines. 1997 *Beef Research Report - Iowa State University*. A.S. Leaflet R1462.

**Customer Service**  
**(800) 843-3386**

**[www.livestock.novartis.com](http://www.livestock.novartis.com)**