

Table
Characteristics of vaccines against duck virus hepatitis

Vaccine/strain (Manufacturer)	Vaccine type	Infectious activity / expression system or vector	Immunity	Commercial use
“ARRIAH-DVH” / strain “VGNKI-K” (Federal Centre for Animal Health, Russia)	Live attenuated embryo	A single immunizing dose of the vaccine contains no less than 3.4 lg ELD ₅₀ /0.5 mL for ducklings up to 30 days of age, and no less than 4.7 lg ELD ₅₀ /mL for adult ducks	Immunity to DVH develops within 48 hours, persisting for at least 30 days in ducklings after a single vaccination and for at least 6 months in adult ducks following two inoculations	The vaccine is marketed in the Russian Federation
AVAC DVH Live (AVAC Vietnam Joint Stock Company, Vietnam)	Live attenuated embryo	One inoculation dose contains at least 10 ^{3.3} ELD ₅₀	Immunity develops within 3– 5 days, peaks on day 7, and lasts for up to 1 month	Commercial
Modified live vaccine (USA)	Live attenuated	–	A weak immune response is developing. On day 8, it provides protection to an average of 24% of the livestock	No information available
Hepatovax (Merial, France)	Live attenuated	One inoculation dose contains at least 10 ^{3.7} ELD ₅₀	Administered subcutaneously to day-old ducklings. Immunity develops, but its duration in ducklings remains undetermined	Commercial
Vaccine from CH60 strain (Huapai Biotechnology Group, China)	Live attenuated	One inoculation dose contains at least 10 ^{4.0} ELD ₅₀	It is administered to ducklings aged 1–7 days. Immunity lasts for over 1 month. Vaccination of laying ducks before egg laying provides the offspring with passive immunity for up to several months	Commercial
Vaccine from strain AP-04203-P100 DHAV-3 (Republic of Korea)	Live attenuated	–	It induces immunity against DHAV-3 with a single injection, without any clinical signs	Pilot
Vaccine based on SD70 strain (China)	Live attenuated	One inoculation dose of the vaccine contains at least 10 ^{7.5} ELD ₅₀ /mL. The minimum effective dose is 10 ^{2.5} ELD ₅₀ /mL	Immunity is induced against DHAV-3	Pilot
Bivalent vaccine against DHAV-1 + DHAV-3 from strains DHV- HSBP100 and AP-04203-P100, respectively (Republic of Korea)	Live attenuated combined	–	Protects ducklings from infection with both genotypes on days 2–3 post vaccination. The immune response reaches its peak 3 weeks after vaccination and lasts until 6 weeks	Pilot
Vaccine against DHV type I based on strain VN-3 (All-Russian Research and Technological Poultry Institute, Russia)	Inactivated by aminoethylethyleneimin, oil-adjuvanted with AB-4M	Vaccine activity ranges from 7.0 to 7.5 lg ELD ₅₀ /mL	Vaccine is administered subcutaneously to parent flock birds once, 30 days before the expected onset of egg-laying. Dose: 2.5 × 10 ⁴ –2.5 × 10 ⁵ ELD ₅₀ /mL	Pilot
Vaccine against DHV type I based on strain VN-3 (All-Russian Research and Technological Poultry Institute, Russia)	Inactivated with INAK biocide, with AB-4M oil adjuvant	Infectious activity of DHV-1 before inactivation – (7.2 ± 0.2) lg ELD ₅₀ /mL	–	Pilot
Inactivated emulsion vaccine against DHAV-1 from strain 3M-UNIIP (All-Russian Research and Technological Poultry Institute, Russia)	Inactivated with aminoethylethyleneimine, with Montanide ISA 70 oil adjuvant	A virus-containing material with an infectious titer of (7.5 ± 0.1) lg ELD ₅₀ /mL was used for production	–	Pilot

Vaccine/strain (Manufacturer)	Vaccine type	Infectious activity / expression system or vector	Immunity	Commercial use
Orniduck (Bioveta, Czech Republic)	Inactivated	One inoculation dose contains at least $10^{5.0}$ KELD ₅₀	–	Commercial
Bivalent vaccine against DHAV-1 and DHAV-3 (Yebio, China)	Inactivated bivalent	–	Immunity persists for more than 5 weeks	Commercial
Vector vaccine based on: VP0 gene of DHAV-1, VP1 gene of DHAV-1 or DHAV-3, P1 + 3C genes of DHAV-3 (China)	Recombinant vector	Vector – DVE virus	High immunogenicity against DVH and DVE	Pilot
Recombinant vaccine from VP1 or VP3 genes of DHAV-1 (China)	Recombinant vector	Avian adeno-associated virus	Induces protective immunity in ducks	Pilot
Recombinant vaccine from VP1 genes of DHAV-1 and DHAV-3 (China)	Recombinant vector	Vector is the Newcastle disease virus	Production of virus-neutralizing antibodies	Pilot
Recombinant vaccine from VP1 protein of DHAV-1 (China)	Subunit protein	Expressed in <i>Pichia pastoris</i>	Humoral and cell-mediated response	Pilot
Recombinant vaccine consisting of the DHAV- 3 VP1 protein combined with flagellin (Taiwan)	Subunit protein combination	<i>E. coli</i> BL21	Enhanced immune response, 75% protection	Pilot
VLP vaccine based on the P1 + 3CD genes of DHAV-1 (China)	VLP-based vaccine	Baculovirus system (insect cells)	Strong humoral immunity, robust protection	Pilot

DVH – duck virus hepatitis;

DVE – duck virus enteritis;

VLP – virus-like particles.