Abstract

KHV has made mass mortality in koi and common carp, and spread out to many countries. In Indonesia, KHV has caused outbreaks of mass mortality in many provinces, and cause economic losses and significant social matter. The aim of this research are to recognize and to analyze genetic variation of KHV that infects *Cyprinus-carpio* and to recognize its biogeographic distribution in Indonesia as well as to recognize and to analyze tissues pathological changes which infected by KHV. In this research, the fish that have been used are koi and common carp which suspected infected by KHV according to the clinical symptoms derived from 20 provinces in Indonesia. In every fish sample was taken its gill to PCR examination and then was done sequencing DNA (for KHV positive samples), for histopathology and immunohistochemistry examination, the organs that were taken: gill, kidney, spleen, intestine or digestive tract, liver, heart, and brain. Based on the results of sequencing DNA KHV and phylogenetic tree construction that has been made, there are 17 variants from 18 samples KHV positive was found. Those variants can be grouped into two clusters: the main branch which consisted of group 1 includes variants KHV from South Kalimantan, Lampung, West Papua, West Kalimantan, West Java, Bali, East Nusa Tenggara. Then group II consists of KHV variants from North Sumatra, West Kalimantan, West Nusa Tenggara, Riau, East Kalimantan, and DKI Jakarta. Related to the infections of KHV variants on koi and common carp, pathological changes were found in such organs (gill, spleen, kidney, intestine and digestive tract, liver, heart, and brain). Pathological changes in gill organ was found proliferation of epithelial cells and fusion of secondary lamella, hypertrophy epithelial cells of gill lamella, telangiectasis, the inclusion body, edema, proliferation of hyaline layer and fibrosis at the base of the gills. Spleen pathological change was found infiltration of inflammatory cells or lymphocytes, appeared MMC, hemorrhage, congestion, and edema. Kidney pathological change was found hemorrhage, proliferation of cells in the interstitial, MMC, thickening of the tubule, inflammation of the glomerulus, the inclusion body, congestion, edema, fibrosis, necrosis of the glomerular. Intestine and digestive tract was found hemorrhage, enteritis, proliferation, goblet cells, fusion of the villi, deposit enterolit on gastric, congestion, edema, and necrosis in krypta. Liver pathological change was found hydropic degeneration, perivascular cuffing, congestion, and fibrosis. Heart pathological change was found infiltration of inflammatory cells or lymphocytes in the endocardium, hemorrhage, epicarditis, pericarditis, myocarditis, vacuolization, congestion, edema, fibrosis, and necrosis.

Keywords: Koi Herpesvirus, Genetic Variation, Pathological Change, *Cyprinus carpio*. 