Identification of pathogenic leptospira in rat and shrew populations using rpoB gene and its spatial distribution in boyolali district

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Abstrak

Leptospirosis merupakan masalah kesehatan di Indonesia. Hingga April 2014, dilaporkan kasus leptospirosis yang ditularkan oleh tikus di Kabupaten Boyolali dengan angka kematian 83,3%. Genus Leptospira terdiri dari ratusan serovar dan tipe genetik yang hidup di pelbagai jenis habitat. Pengelompokan spesies Leptospira berdasarkan gen rpoB dapat digunakan karena tingkat polimorfisme gen tinggi. Penelitian ini bertujuan untuk mengidentifikasi serovar bakteri Leptospira pada populasi tikus di Kabupaten Boyolali menggunakan analisis hubungan kekerabatan didasarkan pada polimorfisme gen rpoB dan menggambarkan distribusi spasial tikus positif Leptospira di Kabupaten Boyolali. Penelitian potong lintang dilaksanakan pada April 2014 di Desa Sindon Kecamatan Ngemplak dan Desa Jeron Kecamatan Nogosari, Kabupaten Boyolali. Pemeriksaan Polymerase Chain Reaction dilakukan pada 104 sampel ginjal tikus dari dua lokasi penelitian. Analisis spasial sederhana dilakukan untuk memetakan sebaran tikus yang positif Leptospira. Terdapat enam sampel positif gen rpoB Leptospira pada Rattus tanezumi, Rattus argentiventer dan Suncus murinus. Lima dari keenam sampel menunjukkan hubungan kekerabatan yang paling dekat dengan Leptospira borgpetersenii serovar Sejroe berdasarkan gen rpoB. Satu isolat tidak memiliki hubungan kekerabatan yang dekat dengan serovar manapun yang masuk dalam cluster. Analisis spasial berdasarkan jarak aktivitas harian tikus menunjukkan tikus positif Leptospira ditemukan berada dalam kisaran 30 meter dan 150 meter dari penderita leptospirosis.

.....Leptospirosis becomes health problem in Indonesia. Until April 2014, leptospirosis cases transmitted by rats were reported in Boyolali with case fatality rate (CFR) by 83.3%. Leptospira genus consists of various serovars and genetic types living in different environment. Leptospira species classification based on rpoB gene could be used as this gene has high polymorphism level. This study aimed to identify Leptospira serovars in rat population using kinship analysis based on rpoB gene polymorphism, and describe spatial distribution of rats with Leptospira positive in Boyolali District. A cross-sectional study was conducted on April 2014 at Sindon Village in Ngemplak Subdistrict and Jeron Village in Nogosari Subdistrict, Boyolali District. Polymerase Chain Reaction test was performed on 104 rat kidney samples from two locations of study. Spatial analysis was conducted to map distribution of rats with Leptospira positive. There were six positive rpoB gene samples in Rattus tanezumi, Rattus argentiventer and Suncus murinus. Five of six positive samples showed the closest genetic kinship to Leptospira borgpetersenii serovar Sejroe based on rpoB gene. One isolate did not have a close genetic kinship to any serovar included in the cluster. Spatial analysis based on home range buffer zone showed rats with Leptospira positive were found in 30 meter and 150 meter from leptospirosis patients.