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Technical Note
Systematics and Current Nomenclature of Leptospira

Guillermo Barreto Argilagos; Herlinda Rodríguez Torrens

Ignacio Agramonte Loynaz University of Camagüey, Cuba

guillermo.barreto@reduc.edu.cu

INTRODUCTION

Since the first application of molecular techniques in the 1970s, the pillars of systematics until then based on phenotypical traits, were eroded. Its impact has been more intense in the area of microbes, particularly, bacteria (Salmonella and Leptospira are remarkable examples). The former has been previously studied (Barreto *et al.*, 2012); the latter must be further examined, considering its repercussion in the field of veterinary medicine and general health.

DEVELOPMENT

Taxonomic aspects

The use of molecular techniques and increased use of genomic information have led to organizational changes in genus Leptospira in the last decades (International Committee on Systematics of Prokaryotes Subcommittee on the Taxonomy of Leptospiraceae, 2014).

Today, there are 21 genome species: nine of them are pathogenic (*L. alexanderi*; *L weilii*; *L. borgpetersenii*; *L. santarosai*; *L. kmetyi*; *L. alstonii*; *L. interrogans*; *L. kirschneri*; *L. noguchii*); six are intermediate (*L. licerasiae*; *L. wolffii*; *L. fainei*; *L. inadai*; *L. broomii*; *L. idonii*); and a similar number are non-pathogenic (*L. vanthieli*; *L. biflexa*; *L. wolbachii*; *L. terpstrae*; *L. meyeri*; *L. yanagawae*). Some pathogenic serovars frequently found in animals now belong to other species, like L. interrogans serovar Grippotyphosa, which is now *L. kirschneri*serovar Grippotyphosa (Levett, 2015).

The pathogenic group includes strains isolated from humans and animals; the intermediate species are those whose 16S rRNA sequence differ from the other two groups, and their virulence has not been experimentally determined yet; the non-pathogenic strains or saprophytes are the ones found in the environment (Picardeau, 2013).

Although there has been an increase in the number of species, most serovars (the serogroups too) remain the same. Nevertheless, there may be exceptions, like Hardjo: hardjo-bovis (widely spread in the United States and a large part of the planet), species *L. interrogans,* now a serovar of *L. borgpetersenii; whereas the* less frequent hardjo-prajitno type, stays within the *L. interrogans species* (Lunn, 2015a).

Nomenclature

As stated above, the species meet the standards of the international scientific terminology. They are named with two words: the first defines the genus with capital letter; the second uses lower case to define the species. Both must be distinctive, written in bold italics, or underlined (Pelczar and Reid, 1968).

In turn, each species is subdivided into a many serovars, the most widely used category in epidemiological and serological studies, as well as in treatment and prevention of the disease, though not following the standards of scientific terminology. They must be written in capital letter, not italics or other requirements for genus and species. One example would be *Leptospira interrogans* serovar Icterohaemorrhagiae (Levet, 2015).

It might be assumed then that the nomenclature rules are the same as the ones for Salmonella. However, it is a mistake to place the serovar right after Leptospira for these spirochetes; in short, Leptospira Icterohaemorrhagiae (Levet, 2015), which is valid for the serovars of the enterobacterium (Barreto *et al.*, 2012).

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