A Historical and Systematic Analysis of the Hardy-Weinberg Law

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Abstract

A central law in population genetics is the Hardy-Weinberg Law. In its standard formulation, it states that, if only one gene with just two alleles, A and a, is considered, it can be mathematically proved that given that certain conditions are fulfilled, the frequencies or relative proportions of the alleles A and a in the population will not change from one generation to the next, after the second generation. Thus, equilibrium will be reached in one generation and will remain unchanged after the second generation. This equilibrium is expressed by the following equation: p2 + 2pq + q2 = **1,** where p denotes the frequency of one allele, q denotes the frequency of the other allele, p2 denotes the frequency of homozygous individuals for an allele, q2 is the frequency of homozygous individuals for the other allele, 2pq is the frequency of heterozygous, and the sum p and q should always equal l.
From a historical point of view, it is worth to note that one cannot find the standard formulation neither in Hardy's nor in Weinberg's work.

From a systematic point of view, it is usually said that the Hardy-Weinberg Law is (logically) derived from the Law of Segregation of classical genetics – the so-called 'Mendel's First Law'.
The aim of this communication is to present an analysis of the different historical formulations of the so-called 'Hardy-Weinberg Law', and to compare them, as well as of its assumed (logical) derivation from the Law of Segregation.

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