

[Fragment] Early history of population genetics and phylogenetics

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1 Population genetics

1.1 Timeline

- Sir Ronald Aylmer Fisher, FRS (17 February 1890 – 29 July 1962) was an English statistician, evolutionary biologist, eugenicist and geneticist. He was described by Anders Hald as "a genius who almost single-handedly created the foundations for modern statistical science," and Richard Dawkins described him as "the greatest of Darwin's successors" [THE SOURCE: <http://digital.library.adelaide.edu.au/coll/special/fisher/>]
- Sewall Green Wright (December 21, 1889 – March 3, 1988) was an American geneticist known for his influential work on evolutionary theory and also for his work on path analysis. [<http://www.genetics.org/cgi/reprint/119/1/1.pdf>]
- John Burdon Sanderson Haldane FRS (5 November 1892 – 1 December 1964), known as Jack (but who used 'J.B.S.' in his printed works), was a British-born geneticist and evolutionary biologist. [http://en.wikipedia.org/wiki/J._B._S._Haldane]

1.2 Mendelian inheritance versus blending (saltation versus gradualism)

(phenotype, genotype, diploid, haploid, inheritance, dominance)

1.3 Hardy-Weinberg: random mating: AA, Aa, aa, p(A)

- probability of combining:

$$\text{Two } A \rightarrow p(A)p(A),$$

$$\text{Two } a \rightarrow p(\neg A)p(\neg A)[p(a) = p(\neg A) = 1 - p(A),$$

$$Aa \rightarrow p(A)p(a) + p(a)p(A)$$

- we get $p^2 + 2p(1 - p) + (1 - p)^2 = 1$

Example: take 800 individual from the wild and breed randomly 500 AA, 300 aa, calculate $p = f(AA) + 1/2f(Aa) = 5/8$. Random mating produces $f(AA) = (5/8)^2$, $f(Aa) = 2 \times 5/8 \times 3/8$, and $f(aa) = (3/8)^2$, the allele frequency calculated from this is now $p = (5/8)^2 + 5/8 \times 3/8 = 5/8$, thus the next generation will be in the same proportions.

2 Phylogenetics

3 Conclusion