

Why didn't Darwin discover Mendel's laws?

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Mendel solved the logic of inheritance in his monastery garden with no more technology than Darwin had in his garden at Down House. So why couldn't Darwin have done it too? A *Journal of Biology* article argues that Darwin's background, influences and research focus gave him a viewpoint that prevented him from interpreting the evidence that was all around him, even in his own work.

Darwin's commitment to quantitative variation as the raw material of evolution meant he could not see the logic of inheritance, argues Jonathan Howard of the University of Cologne, Germany.

"Quantitative variation was at the heart of Darwin's evolution, and quantitative variation is the last place where clean Mendelian inheritance can be seen," says Howard. "Darwin boxed himself in, unable to see the laws of inheritance in continuous variation, unable to see the real importance of discontinuous variation where the laws of inheritance could be discerned."

Moravian priest and scientist Gregor Mendel (1822 - 1884) studied clear-cut, inherited traits in pea plants, which he grew in the monastery gardens in Brno. Mendel showed that trait inheritance follow simple laws, which were later named after him. Mendel's work was rediscovered at the beginning of the 20th century, and laid the foundations for genetics. Mendel had a good understanding of biology, but his understanding of physics, statistics and probability theory were far superior to Darwin's.

Darwin's view of biology was greatly influenced by geologist Charles Lyell during and after the 1831-1836 Beagle voyage, leading to Darwin's focus on infinitely tiny differences between individuals giving infinitesimal advantages or disadvantages in survival. For Darwin, selection of these variants over hundreds of thousands of generations was the critical process in evolution.

Darwin's book *The Different Forms of Flowers on Plants of the Same Species* details breeding experiments involving a well-defined "unit" character, yielding clear data interpretable as 'Mendelian' ratios. But these went unremarked by Darwin, who insisted, because of his belief that only quantitative variation contributed to evolution, that the rules of inheritance were too complex and not ready for definitive analysis.

Heredity and variation played central roles in Darwin's development of the theory of evolution by natural selection. His view that variation is caused by random, quasi-physical events outside environmental control, is much as we believe today. But he never freed himself from the incorrect belief that environmentally determined changes could also be inherited, another victim of his focus on quantitative characters, height, weight and so on, which are strongly influenced by environmental effects.

This year marks the bicentennial of Darwin's birthday, and 150 years since his book "The Origin of Species" was first published.

More information: Why didn't Darwin discover Mendel's laws? Jonathan C Howard, *Journal of Biology* 2009, 8:15 (24 February 2009), jbiol.com/content/8/2/15

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