Rowland Biffen, Little Joss and Yeoman: looking back at two successes behind the birth of NIAB in 1919

Berris Charnley

Berris Charnley is currently studying for a PhD in History of Science, Technology and Medicine at the University of Leeds. His thesis focuses on the relationship between genetics and agriculture from 1880-1930, analysing the ways in which agriculture provided an important context for the development of the – then new – study of heredity. In the last year he has been using NIAB's extensive and unique archives to research the relationship between the institute and the first geneticists working at Cambridge University.

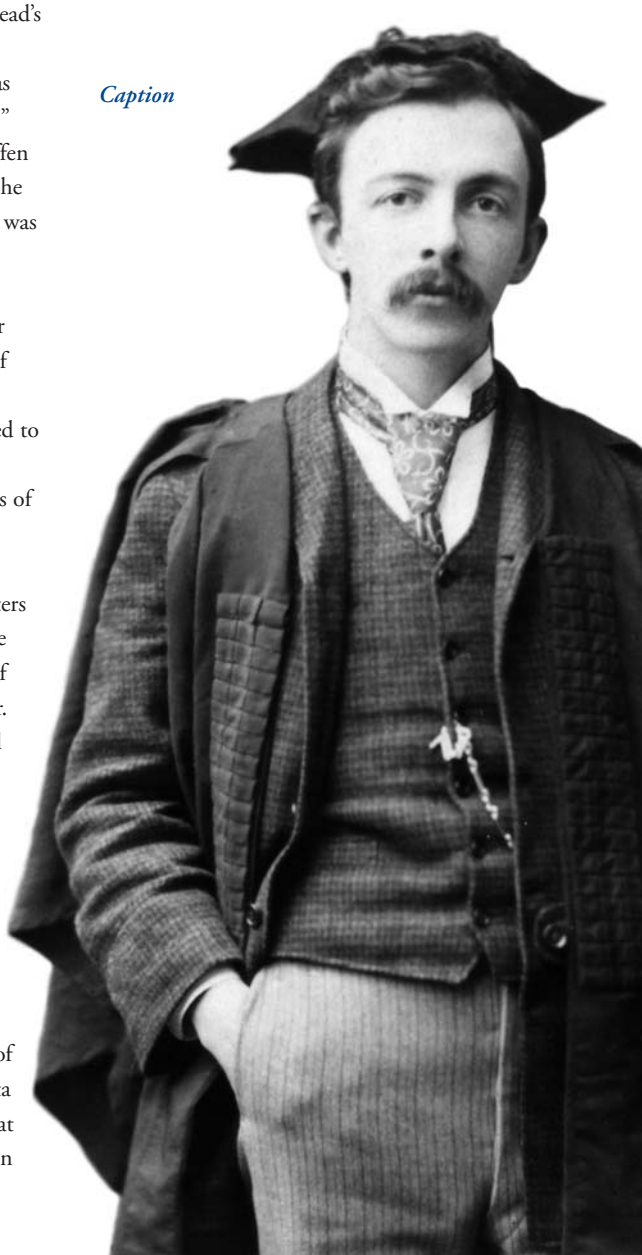
Anniversaries are a strange time for historians. On one hand, a good anniversary will provide free dining for a year, as many of my colleagues who study Charles Darwin have noted in 2009 – the anniversary of both Darwin's birth and the publication of On the Origin of Species. On the other hand though, the historian's message is often that, 'it was all much more complicated', and this is a phrase which jars with any simple celebration of greatness. So when I was asked to write this piece for NIAB's 90th birthday my concern was how best to add to the party without being a killjoy? One of the most interesting features of the early years of NIAB for me is the great success of two varieties bred by the institute's first scientific advisor, Rowland Biffen (see figure 1). In what follows I'd like to remember the success of those varieties but also spend some time being thoughtful about what made them so successful.

Rowland Biffen began what he called 'systematised plant breeding' at Cambridge University in 1903. Biffen was the son of a Cheltenham school master, who followed the expected path and went up to Cambridge. At the University, Biffen did very well, he got a double first in the Natural Science Tripos and was awarded a Frank Smart Studentship, choosing to study mycology with Henry Marshall Ward. In 1897 he was nominated to join a University sponsored expedition to study rubber production in Central America, Brazil and the West Indies. Upon his return, and perhaps inspired by what he saw, Biffen began to focus his research on agriculture. After receiving lessons from William Bateson in 1902 he began employing Bateson's teachings on heredity to plant breeding, believing this allowed him to perform hybrid crosses in a new rational manner. Essentially the new thinking was that plants were composed of independent and stable unit-characters. These, Biffen believed, could be rearranged through crosses between different varieties, in this way Biffen hoped to build up an ideal type.

Biffen began working first with wheat varieties. He believed wheat was an ideal genetic model but the plant presented one major problem. According to thinking at the time, the wheat plant had reached its yielding limit. Given this apparent constraint Biffen had to come up with ways to improve farmers' profits indirectly if his research was going to be of practical value. The first strategy he chose was to create a disease resistant variety by crossing a variety with yellow rust immunity with one with a high yield. The result of this work was Little Joss, created from a cross between Ghirka and Squarehead's Master varieties (see figure 2). The name apparently came by chance after Biffen was asked "what's that little josser there called?" After the release of Little Joss in 1910, Biffen switched his attention to another strategy he had been developing simultaneously. This was an attempt to breed a high yielding bread making wheat which could be grown in British conditions, and command a higher price for farmers. Yeoman was the result of this work; it was developed from a cross between Red Fife and Browick and released to farmers in 1916 (see figure 3).

A statistical analysis of the initial success of Biffen's varieties is almost impossible to reconstruct as the data simply was not collected before the 1920s. However, Carters and Gartons (the two big seed firms of the time) were both selling their own stocks of Little Joss by 1918 and Yeoman soon after. The varieties remained in cultivation until the 1930s and when Biffen was given the Darwin Medal by the Royal Society in 1920 it was claimed that the two varieties accounted for nearly a quarter of the wheat acreage in the country. Biffen's varieties were also popular with farmers; in 1921 Biffen was awarded a silver bowl by the Essex farmers' club at the Shire Hall in Chelmsford, in honour of the success of Little Joss and Yeoman. Data recorded from the mid 1920s indicates that in the eastern counties by 1925, the year in which Biffen was knighted for his contributions to agriculture, Little Joss and Yeoman accounted for more than 150,000 acres between them, this was, just as the Royal Society had thought, roughly a quarter of the country's wheat acreage.

It was the success of these varieties that provided a large part of the raison d'être for Laurence Weaver - Biffen's boss at the Food Production Department of the Board of Agriculture during WWI – to establish NIAB in 1919. Weaver also intended the institute to take an active role in regulation of the seed



Caption

Rowland Biffen, Little Joss and Yeoman: looking back at two successes behind the birth of NIAB in 1919 *continued*

market but it was the need to help Biffen get his new varieties to farmers that loomed largest in the various prospectuses Weaver produced to promote his plans for NIAB. When the institute was opened Biffen worked on several of its working committees and he remained the institute's chief scientific advisor until the late 1930s.

Yet the success of Biffen's varieties comes as something of a surprise when set against the standard story of agricultural development in this country prior to World War Two. Yield per acre remained fairly constant until the 1940s so it has often been assumed that the most important advances before 1939 centred on increasing mechanisation; the rise of the tractor. But if Biffen's varieties, which were sold at premium prices, didn't increase yield per acre directly, why were they so popular? As we've already seen Biffen believed the wheat plant had reached its genetic limit as regards yield and so he devised two other strategies to increase profits, disease resistance and quality. So how successful were these strategies?

Let's take the case of Little Joss and disease resistance first. In 1906 Biffen believed that nearly 5% of the annual wheat crop was being lost to yellow rust, hence the need for a resistant variety. However, many farmers grew Little Joss for another reason; the variety did remarkably well on light soils and required little fertiliser. In a period before government subsidies and trade tariffs this allowed farmers, who were in direct competition with the more extensive systems of wheat production in the US and Canada, to reduce their production costs. Little Joss also allowed them to expand the area under acreage, using land that was previously considered unsuitable. The ability to utilize land was important during World War One as the Government introduced schemes for compulsorily increasing the country's productive acreage, Little Joss played an important part in that process. By 1919, when the Board of Agriculture published a piece on Little Joss' success, they recommended the variety's ability to grow on poor soils, rather than its rust resistance.

Yeoman, Biffen's second variety, represented the culmination of a longstanding collaboration between himself and a group called the Home Grown Wheat Committee – established at the turn of the century to represent the milling industry. The group's aim was to increase the percentage of British flour used to produce a loaf of bread. They hoped to do this through the introduction of higher quality bread strains of wheat onto British farms. Biffen and the committee showed through an extensive series of baking tests that pure Yeoman flour could make a loaf to compete with the best imported flour. Their hope was that millers could be encouraged to pay a premium for Yeoman wheat, instead of paying the transportation costs of importing wheat. This strategy was widely touted in the first quarter of the century as "the Home Grown Wheat Solution". It seems however that the strategy was very slow to come to fruition; the home grown loaf didn't really take off until World War Two and in the years after Yeoman's release in 1916 millers were reluctant to pay more for Yeoman, especially as pure batches (unmixed with other lower quality varieties) were difficult to obtain.

If millers couldn't be induced to pay more for Yeoman wheat how can we explain farmer's apparent willingness to pay a premium for Yeoman seed? The answer seems to have been that Yeoman was also a very good yielder, for two reasons. Firstly the variety was well suited to the heavy rich soils found across Essex and East Anglia. Secondly it had a much shorter thicker straw that Little Joss meaning it could be fertilised more heavily without fear of becoming lodged, or blown over, as the weight of the ears became too great for the stem to support. In this way farmers who could afford good land and furthermore to fertilise it, could make the most out of these resources. It wasn't that Yeoman yielded more per se but that the variety was more reliably responsive to intensive treatment.

So what does this all mean? Does this story suggest Biffen's varieties were accidentally successful? Almost certainly not. The point which I think is worth celebrating here, in this story about NIAB's earliest years, is that the traffic was not all one way. While on one side of the street Biffen applied genetics to plant breeding to produce new varieties, on the other, farmers found new and inventive ways to use them. Viewed in this light the success of Little Joss and Yeoman was neither entirely intentional nor accidental, but the result of a collaboration between farmers and scientists.

Caption

Further reading:

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