

Darwin, Queensland

22/1/65

Dear Dr. Martin,

I must apologise for tardiness in replying to your query on Dr. Reber's interesting experience with Hawaiian beans. I have been, and still am, rather at a loss for a satisfactory explanation — and I had just drafted a reply about a fortnight ago when my appendix was suddenly removed — and now I am writing as I convalesce.

While I have been breeding beans for some years, I have never studied seed colour inheritance, and, beyond recalling that it is affected by at least eight factors, I can only draw on chance observations from my breeding work.

My first reaction would have been to attribute these changes to a chance cross with some other bean variety. This is supported by the range of characters affected including growth habit & fertility; and it would be interesting to observe whether any other characters such as size & shape of seed & pod are affected. As regards chances of crossing, Dr. Reber may know something of the proximity of other bean varieties.

However, at the first evidence of a cross (in the F₁) all the seed of the hybrid plant would be of the distinctive type — and, I doubt that this was the case. Also, I know of no instance where white seed has occurred in a progeny without a white seeded parent, or a parent heterozygous for white seediness being involved. A chance cross

very unlikely, while, if a white seeded
pollen parent was by chance involved, I know
of no case where a distinctive black seeded F₁
would have resulted.

Altogether it seems that this is a
case of a rather complex ^(or heterozygous) mutant, and it would
be of interest to study the full range of characters
involved. To do this would require considerable
populations so that not only the range but
also the relative frequencies of the different
types could be recorded. This would scarcely
be possible in the early stages, when the number
of seed available is small, but inheritance
could be studied in later generations when
considerable populations are available.

From my own observations on flower
colours I know of no case where white seed are
not associated with white flowers. However seed
and pod colours are not so closely tied and white
seed are occasionally found in purple podded types.

The occurrence of off type in our varieties
and breeding lines is always a problem, and
hitherto I had given little thought to the possibility
of complex mutations, normally blaming mixtures
or chance crosses. I shall now be more alert
to this other possibility.

I am enclosing herewith your very good
slides, and regret both the lateness of this
reply & my limited knowledge of this phenomenon.

Yours sincerely

H. H. Gregory