

March 12, 1937

Dear Ford,

I am sending, as I hoped to do before, some sheets giving an idea of the calculations on the Cara data. I think the calculation sheet will be intelligible, and you will see I have proceeded in a purely empirical way, e.g., as 33 were released on the 18th, the 50% available for recapture on the next day were 16.5, and, as 27 times as many were captured as recaptured, the number available for capture is estimated to be 27 times as great, or 446. The 16.5 marked were increased by 52 new markings, making 68.5, of which 34.25 should be available for recapture on the 20th. In this way one gets a series of estimates, which, apart from the survival rate assumed, will be independent.

If too high a survival rate is assumed, the number of marked insects available for recapture will be increasingly over-estimated as the work proceeds, and, consequently, the numbers flying will be increasingly overestimated. This effect is well shown by comparing the red graph, drawn for 70% survival from one day to the next, with the ink graph for 50%. It would seem that 70% is definitely too high a survival rate, though this is a judgement really for the entomologist to make.

In the last column I have used the successive population values to provide estimates of the numbers emerging between each day and the next, e.g., if there were 446 at large on the 19th, and 223 of those survived the next day, then 753 must have emerged to make up the estimated total of 976 on the 20th. The total number emerging is less influenced by the survival rate assumed than is the number flying at any one time, i.e., 70% survival leads to a total emergence, apart from omissions, of 7,700, while 50% give 4,700. It would seem that 5,000 for the total breeding population might not be at all a bad estimate, the number of flying being about 1,000 at their highest levels.

If the work is repeated, it would, as I think you will agree, be worth while to make the marks so as to date releases. This should not only confirm the rather surprising inference as to survival from day to day, but might give evidence on a point on which, at present, I feel quite in the dark, namely, that it seems probable that the survival rate is higher at the beginning of the season than it is at the end. If this is true, the population estimated ought to be higher in the middle, and lower at both ends, than those shown in the ink graph. The form of the graph does, I think, suggest that this is really so; but without dated releases I do not think any appropriate allowance could be made.

I am exceedingly sorry that we must not expect you
on the 18th.

Yours sincerely,