vertical contrasting stripes. A 10 in. wide strip of blue wrapping paper encircling the middle of each can was smeared with a non-drying adhesive. Eight of these traps were located at intervals covering a distance 60 ft. upstream and 145 ft. downstream on the bank of the river opposite the tagging site; the river at this point was 35 ft. wide. As shown in Table 1, about 261,600 flies were captured by means of these traps.

Two methods of detecting radioactive flies on the paper strips were used in this work. In the first, a number of 0.5 in.² samples from the centre line of the paper strips were tested in a sensitive low background scaler. This technique revealed the presence of about thirty-seven radioactive flies (Table 1). The cutting and handling of the small squares proved to be slow and laborious and, because only a small number of samples from each strip could be counted, this method was soon discarded in favour of an autoradiographic technique by which the whole area of each strip was scanned. The procedure consisted of placing sheets of X-ray film, in light-proof envelopes, emulsion side down on the paper strips. The sticky sides of the strips, with captured blackflies, were covered with thin films of plastic to prevent contamination of the envelope containing the film. Heavy weights were placed on the film to ensure a close contact between the emulsion and the layer of flies. The films were developed after two or three days and radioactive flies could be easily detected by the dark spots visible on the negative. Tests of individuals revealed that the autoradiographic method would identify adults giving less than 10 c.p.m. above background rates. Altogether, 166 radioactive adults were recovered in the study (Table 1).

Table 1. NUMBER OF RADIOACTIVE FLIES DETECTED BY TWO DIFFERENT METHODS

Detection device	Estimated total flies	No. radioactive
Marconi scaler	21,600	37
Autoradiographs	240,000	129
Totals	261,600	166

Table 2. RELATIVE POSITIONS AND NUMBERS OF RADIOACTIVE FLIES CAUGHT AT DIFFERENT TRAPPING SITES

Distance from point opposite tagging site	Estimated totals trapped	No. radioactive
Upstream		
60 ft.	6,250	12
40 ft.	60,600	51
20 ft.	28,650	23
Opposite	25,500	10
Downstream		
20 ft.	19,500	10
40 ft.	54,000	19
75 ft.	40,100	19
145 ft.	27,000	22
Totals	261,000	166

The results at individual traps are shown in Table 2. The data were derived from counted samples and from autoradiographs of strips exposed on cans over a period of 2 weeks following the treatment of larvae and pupae. The largest numbers of radioactive flies were captured in traps immediately above the tagging site, which confirmed visual observations that emerging flies tended to move upstream.

The use of compressed air to aerate the larvae and pupae and the shorter treatment times with the higher concentration of phosphorus-32 used in this investigation combined to avoid excessive mortality among blackfly larvae reported by other workers¹. Also, the traps were fully effective in catching large numbers of adults in the selected locations. The autoradiographic method of scoring tagged individuals proved to be simple, efficient and easily adaptable to field work.

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Effect of Chloramphenicol on Mutants of *Chlorella pyrenoidosa*

In some of the Chlorococcales the biosynthesis of secondary carotenoids (astaxanthin-esters and canthaxanthin¹) and the complete decomposition of the primary pigments (chlorophyll *a* and *b*, carotenoids and xanthophylls) in conditions of nitrogen deficiency can be inhibited by chloramphenicol². With 5×10^{-5} molar chloramphenicol, growth is reduced to about 85 per cent of the normal rate. Chloramphenicol has no influence on the biosynthesis of the nitrate reducing enzymes in these algae³, and this insensitivity seems to be partly caused by the ability of these organisms to decompose chloramphenicol⁴.

We have now investigated the effect of chloramphenicol on heterotrophic mutants of *Chlorella pyrenoidosa* (C-1.1.10.14.1; C-1.1.10.27; C-1.1.10.41 and C-1.1.10.41.8 from the collection of the Kaiser Foundation Research Institute, Richmond, California). The wild strain (C-1.1.10) possesses the biochemical characteristics typical of *Chlorella pyrenoidosa*^{5,6}, that is, hydrogenase activity, a system liquefying gelatine, and the ability to produce secondary carotenoids in conditions of nitrogen deficiency. The mutants studied likewise contain hydrogenase, but are unable to liquefy gelatine or to synthesize secondary carotenoids⁷.

These mutants do not grow when cultivated in an inorganic medium for 3 months⁸. Addition of chloramphenicol (final concentration 10^{-4} molar) caused some cells to turn green after 4–8 weeks. Parallel experiments with 10^{-4} molar glucose or glutamic acid showed that the effect of chloramphenicol was not caused by the assimilation of the carbon skeleton or by the normality of the chloramphenicol. After transfer of these algae into normal inorganic medium (without chloramphenicol) they showed no differences from the wild strain with respect to growth and pigment composition. Furthermore, the reverted mutants could liquefy gelatine and synthesize secondary carotenoids in conditions of nitrogen deficiency in the same way as the wild strain.

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