LOCATION OF THE GENES FOR CYTOCHROME *f*, SUBUNIT IV OF THE *b₆/f* COMPLEX, THE α -SUBUNIT OF CF₁ ATP-SYNTHASE AND SUBUNIT III OF THE CF₀ ATP-SYNTHASE ON THE BARLEY CHLOROPLAST GENOME

by

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The genes for cytochrome *f* (*petA*), subunit IV of the cytochrome *b₆/f* complex (*petD*), the α -subunit of CF₁-ATP-synthase (*atpA*) and subunit III of CF₀-ATP-synthase (*atpH*) have been mapped by heterologous hybridisation of wheat probes to the barley chloroplast genome.

1. INTRODUCTION

Using M13 subclones of wheat chloroplast DNA as probes, the genes for four thylakoid polypeptides have been located on barley chloroplast DNA. The genes are located in analogous positions to wheat DNA. The M13 subclones, supplied by Drs. J.C. GRAY, C.J. HOWE, D.L. WILLEY, A.L. PHILLIPS, and A.K. HUTTLY were characterized in the course of DNA sequence analysis of the genes for subunit IV of the *b₆/f* complex (*petD*), cytochrome *f* (*petA*), the α -subunit of CF₁-ATP-synthase (*atpA*) and subunit III of CF₀-ATP-synthase (*atpH*). Gene designations suggested by HALICK and BOT-TOMLEY have been adopted (2). The M13 subclones were made radioactive (4) and hybridised to 15 plasmids which covered 80% of the

barley chloroplast genome (9). Each probe hybridised to plasmids covering a unique region of the genome. Each plasmid was digested with several restriction enzymes, electrophoresed on agarose gels and transferred to nitrocellulose filters (11). The genes were fine-mapped by hybridisation of the probes to the filters.

2. RESULTS

2.1. Subunit IV of the cytochrome *b₆/f* complex and cytochrome *f*

The cytochrome *b₆/f* complex has been purified to homogeneity from spinach chloroplasts (5). It consists of five major polypeptides. The genes for three of these (cytochrome *f* (*petA*), cytochrome *b₆* (*petB*) and a 15.200 mol. wt.

Abbreviations: kbp = kilobasepairs; pHvC = plasmid containing *Hordeum vulgare* chloroplast DNA fragments; *rbcL* = gene for the large subunit of ribulose biphosphate carboxylase.

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1.7 kbp HindIII fragment. The restriction map of barley and wheat in the area covered by pHvC174 is very similar. This suggests that the barley gene, like the wheat gene, traverses the PstI site in this fragment.

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