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Introduction

Growth analysis is a conceptual framework for resolving the nature of genotype × environment interactions on plant growth and development. In natural environments, growth and development cycles have to be completed within a time frame dictated by environmental conditions where light, moisture and nutrients often limit expression of genetic potential. Adaptive features that counter such constraints and help sustain relative growth rate can be revealed via growth analysis under contrasting conditions.

In managed environments, crop plants commonly experience similar restrictions, but in addition their economic yield is often only a small portion of total biomass at harvest and subject to internal (genetic) control. Whole-plant growth analysis is therefore of interest to those concerned with determinants of yield from crop plants growing singly or as communities.

Accordingly, in their quest for improved genotypes, crop scientists often need to explore plant growth and reproductive development in quantitative terms. Sources of variation in productivity can then be resolved into those processes responsible for converting external resources into biomass and those responsible for partitioning biomass into usable sinks such as cereal ears or pumpkins. Both aspects are addressed here.

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