

THE PARTICIPATION OF PARTICULAR PLANT ORGANS IN THE TOTAL PHOTOSYNTHESIS OF THE WHOLE OIL-SEED RAPE PLANT

Maria Seidler, Stanisław Gwizdek, Lech Wilanowski

Department of Plant Physiology, Academy of Agriculture,
17, Słowackiego Street
Szczecin, Poland

In the production of biomass it is necessary to take into consideration, beside leaves, also the surface of others photosynthetically active organs receiving the considerable part of falling light.

According to Milthorpe, Moorby /1979/, the surface of leave sheath and stem make up to 50% of the whole photosynthetically active surface in wheat and up to 13% in maize. Photosynthesis occurs also in pistils and ears, which for example can produce ca 45% of its dry matter in barley. In the husky wheat the participation of ear photosynthesis is similar and unhusky wheat a little bit smaller.

According to Carlson /1985/ the growth of seeds and fruits depends on photosynthesis of closest parts of plant.

In many plants, among others in oil-seed rape, leaves get older in that time and deliver much less photosynthates to kernels.

In this paper authors try to estimate the participation of particular parts of spring and winter oil-seed rape plants in the total photosynthesis.

Methodes of experiment

The experiment with spring oil-seed rape cultivar Mazowiecki and winter cultivar Górczański was carried out in the years 1981-85.

Plants were sampled randomly from the field experiment during the spring-summer vegetation in the following seven growth stages:

- I. Spring rosette
- II. Stem formation
- III. Inflorescens
- IV. Flowering
- V. Early pods development
- VI. Pods filling
- VII. Pods maturing

Photosynthesis rate was determined on the gas analyzer InfraLyt-4 in the open system.

In the each growth stage the photosynthesis rate was measured for all presently assimilating plant organs.

Results

Results are shown in the figures 1-3. The figure 1 illustrates the photosynthesis rate of particular above-ground plant organs in the particular growth stages. Figures 2 and 3 show photosynthesis intensity for each plant organ taking its weight into account. From the obtained data one can see that up to the pod formation, leaves have dominated in this process for both oil-seed rape forms, but this dominancy was higher for winter oil-seed rape.

Stems and pods participated considerably in the total

plant photosynthesis not before leaves falling. It was some difference between spring and winter oil-seed rape; after leaves falling pods were the major photosynthetic organ for winter form and for spring form also stems participate largely in this process /Fig. 1 and 3/.

Studies has shown that total stems and pods participation in this process is greater for spring than winter oil-seed rape.

Abstract

Investigations concerning the contribution of the total mass of particular above-ground organs of plant in the total plant photosynthesis have shown the dominant part of leaves for both oil-seed rape forms.

More leaves have fallen off the participation of stems and then pods in the photosynthesis of both forms has increased.

The contribution of these both organs /i.e. stems and pods/ in the plant photosynthesis of winter form was very close but in the spring form pods have dominated in this process.

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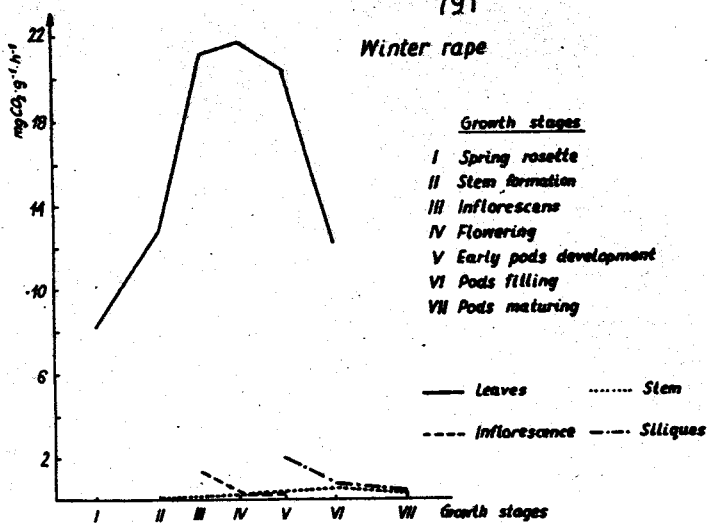
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Winter rape



Spring rape

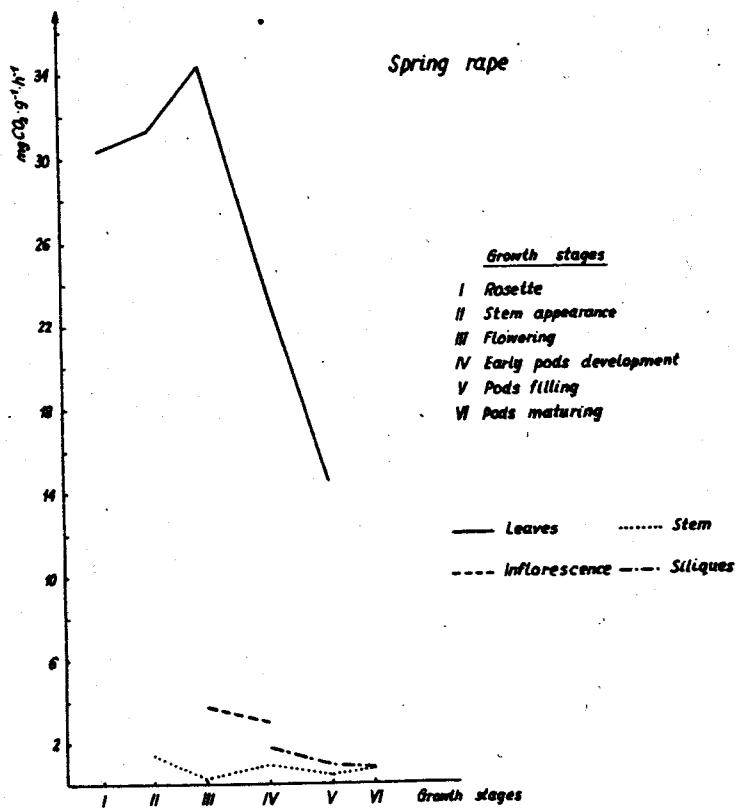


Fig.1 Photosynthesis rate in particular organs

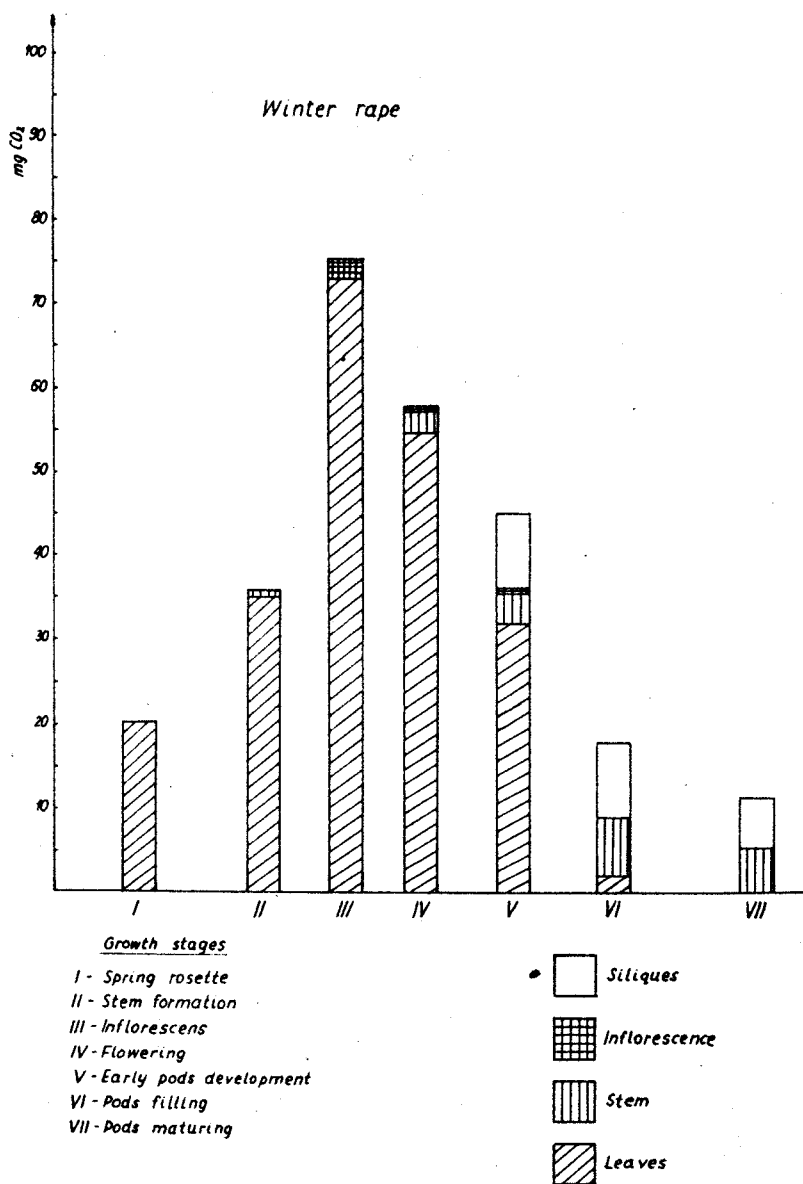


Fig. 2 The participation of particular plant organs in the total photosynthesis of the whole plant

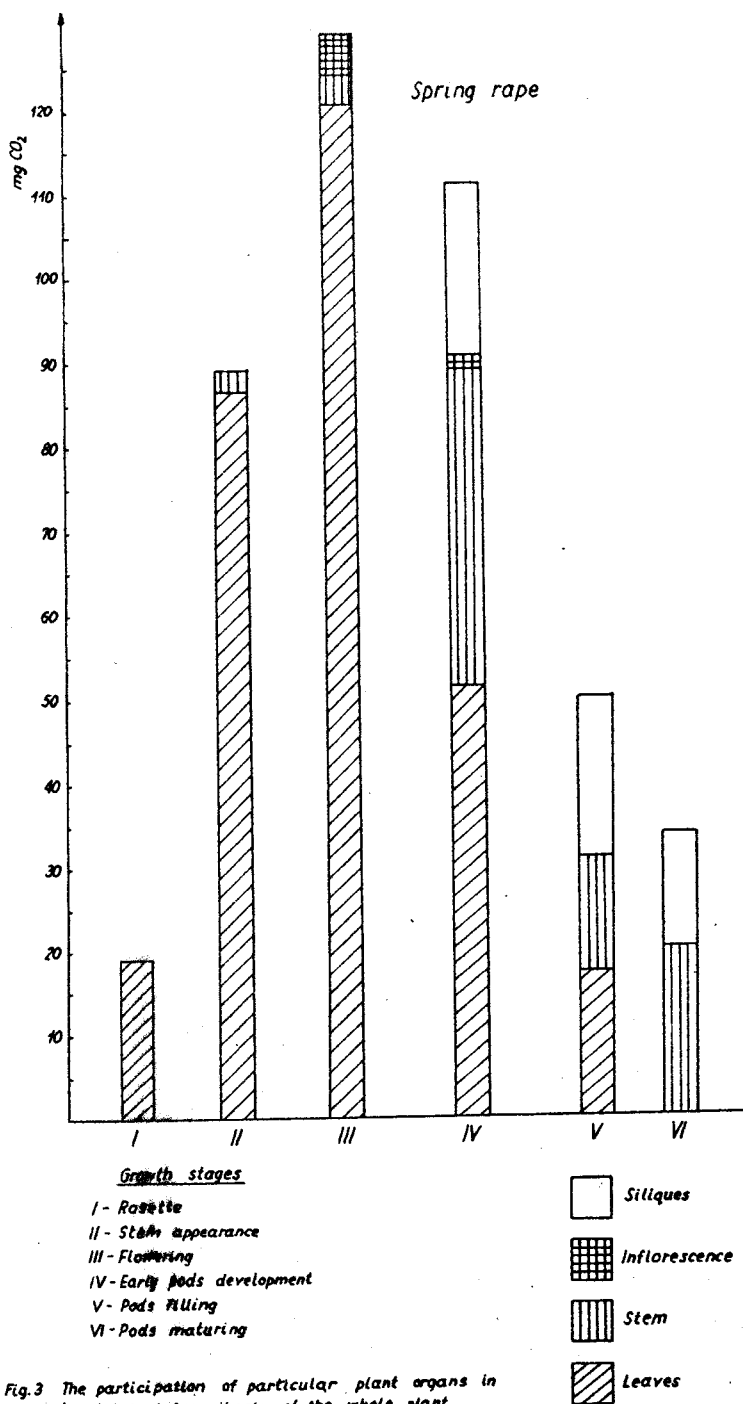


Fig.3 The participation of particular plant organs in the total photosynthesis of the whole plant