INTRODUCTION

The potato is considered a drought-sensitive crop. Its production in Europe has been increasingly affected by droughts over the last 20 years, and these will become more frequent in the future due to climate change.

Breeding programmes should therefore include selection for drought tolerance, which has not yet been fully explored. There is an even greater need for drought-tolerant potato cultivars in low-input and environmentally sustainable agricultural practices, such as organic production.

AIM OF THE STUDY

The aim of this preliminary study is to evaluate the response of two Slovenian cultivars KIS Savinja and KIS Vipava to drought stress under greenhouse conditions by monitoring physiological parameters (leaf water potential, gas exchange parameters, ...).

Obtaining new information on both cultivars and identifying drought tolerance traits would lead to improvement of selection methods in the organic breeding programme of the Agricultural Institute of Slovenia (AIS), which will produce well adapted drought tolerant potato cultivars in the future.

RESULTS AND DISCUSSION

Drought progression (Figure 1): WP range [-0.1, -0.4 MPa], no visible signs of stress on plants → defined as ‘no stress’. WP range [-0.60, -0.9 MPa] at the end of the experiment, wilting and yellowing of leaves occurred → defined as ‘drought’.

KIS Savinja wilted gradually from base to tip, whereas KIS Vipava wilted uniformly (Figure 2b, d) → indicating different drought management strategies

KIS Savinja showed significantly higher photosynthetic performance and WUE under stress (Figure 3E, F, G and H)

Cl under drought stress remained high in KIS Vipava → suggesting that drought stress affects physiological processes more than gas exchange and transpiration (Figure 3D)

Figure 2: Potato cultivars KIS Savinja (a, b) and KIS Vipava (c, d) on 8th (a, c) and 12th (b, d) day of experiment, respectively. On 8th day of experiment approximate values of WP were -0.55 MPa, on 12th day -0.75 MPa.

Figure 3: Changes in physiological parameters under drought stress in potato cultivars KIS Savinja and KIS Vipava. The data are distributed according to the WP range.

METHODS

Pot experiment was conducted at the Agricultural Institute of Slovenia in a greenhouse under controlled conditions (T = 21 °C/15 °C, RH = 60 %, Photoperiod of 14 h light/10 h dark).

2 potato cultivars: KIS Savinja, KIS Vipava.

Terminal drought - start of treatment approximately 8 weeks after planting.

17 consecutive days, 8 plants per day were measured (4 per cultivar), measurements were done on 4th leaf.

L6400 XT, PAM 2100, Pressure chamber (Soil Moisture corp.).

CONCLUSIONS

Cultivar KIS Savinja seems to perform better under drought conditions compared to KIS Vipava.

The results suggest that cultivars may use different strategies to cope with drought.

Further studies on other traits could increase our knowledge on the response of these cultivars to drought.

REFERENCES


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