CROP YEAR × CROP SITE INTERACTION FOR WEEDINESS OF WINTER WHEAT

Ákos TARNAWA – Helga KLUPÁCS – Katalin KASSAI – Zsolt SZENTPÉTERY

Institute of Crop Production, Szent István University, Gödöllő

Introduction

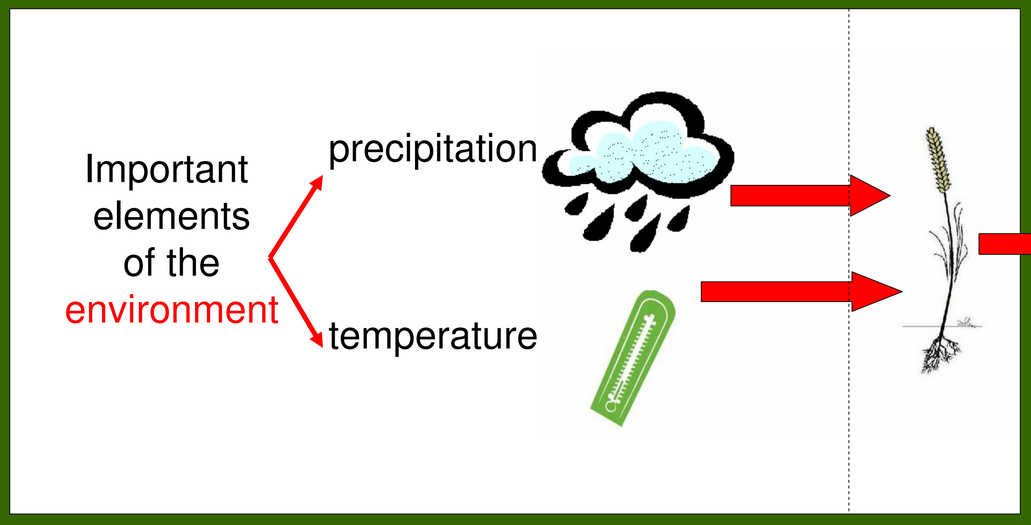
• critical technological points in wheat production: agrochemical applications ➡ essential to reveal and study soundly the impacts
• sustainable agricultural means the production of safety goods and the supply of customers with healthy food
• increased weed infection causes great losses in wheat ➡ necessary to apply herbicides on the weedy fields

• this study focuses on the weed-control, the weediness - in association with the sustainability - in the winter wheat production. If we use less herbicides it might cause less problems. If we should use them we should use adequately.

• weeds are plants competing with wheat for sources in a soil-plant system. As it is harmful for wheat we should control weeds. For the best way of control we should know the connection between weeds and its environment (the soil and climate and so on).

Material and methods

• ten-year small plot (10 m²) experiment in the region of Hatvan-Nagygombos
• split plot design with four replications each year
• collection of basic climate data (average temperature and precipitation, monthly)
• the weediness (pcs/m²) and the yield were measured always in the same fenologic state of winter wheat each year
• we made a 'climatic matrix' with the free combination of any mean temperatures and precipitations of any month in each year (in Table 1. temperature = 'h' and precipitation = 'cs' and the numbers mean the month for what they referring to)
• calculation of r^2 between each value of the matrix and the appropriate value of weediness in each form of life of weeds



Results and discussion

On figure 1 and 2 we can see that connection between climatic factors and the appearance of each kind of weed could be very close. We collected the closest relations in table 1 for all form of life. We can also see function of trend line fitted on each set of measurement values.

Form of life of weeds	Climatic factor	Formula of the function	r^2
T1	h3 x cs1+2	y= 187,53x+117,13	0,813
T2	h12,1 x cs4+5	y= 0,0022x+0,3939	0,705
T2-3	h3 x cs1	y= 0,0059x-0,131	0,917
T3	h1 x cs3+4	y= -0,0034x+0,1688	0,913
T4	h4 x cs12+1+2+3+4+5+6	y= 0,0305x-52,215	0,806
G1	h10,11,12,1 x cs5+6	y= -0,0062x+3,7778	0,821
G3	h10,11,12 x cs9+10+11+12+1+2+3+4	y= 0,0268x-25,238	0,825

Table 1. Connection between climatic factors and the appearance of weeds sorted by form of life

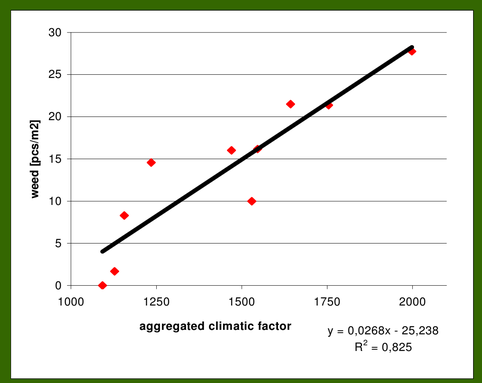


Figure 1. Connection between climatic factors and the phenological pattern of G3 weeds

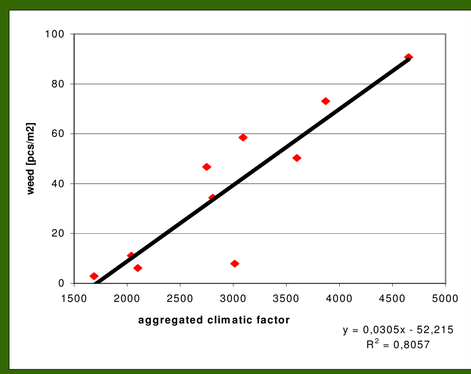


Figure 2. Connection between climatic factors and the phenological pattern of T4 weeds

Conclusion

With the fitted trend lines we can estimate the weediness from simple climatic data in advance.
The weediness (in quantity, measured in our experiments) has close connection with crop year. In our experiment the Alföld 90 winter wheat variety had a good weed oppressive ability. In the sustainable agricultural production there is a possibility to reduce the chemical input - by reducing the weed control – with the suitable variety. In lack of that severe problems may occur.
If we estimate the weediness in advance, we can characterize our procedure for these weeds. That means less herbicide but appropriate ones on an appropriate level.