The Influence of Tillage System on Production and Quality of Soybean Yield In Transilvanian Plain

Mircea IGNEA, Felicia CHEȚAN, Valeria DEAC, Alina ȘIMON

Agricultural Research – Development Station Turda, Cluj county,
Agriculturii street, no. 27, code 401100, www.scdaturda.ro
tel.0264311680, fax. 0264311792, email: mircea_ignea@yahoo.com

Abstract. Between classical or conventional farming system (with plowing, seedbed processing, sowing) and conservative farming system (no tillage), the soil is minimal intervention, there are plenty of tillage methods, specific to certain conditions work, equipment machinery or tradition.

Experiment designed and conducted to ARDS Turda, includes two ways to work the soil, a classic or conventional (with plowing, land preparation and planting) along with a minimum work (“minimum tillage”) in a rotation of three years, the wheat-soybean -maize experimental variants include technological measures that contribute to plant vegetation control in the experiment, namely: fertilization and treatments. ONIX was cultivated soybean variety (created in ARDS Turda), which although not a very new variety, has a good reputation in terms of production. On the other hand it is necessary to show that applying a pure soy conservative system led to some very poor results, both soybeans and corn, and even winter rape, need more or less loose soil.

In the experiment conducted at ARDS Turda conditions, soybean yields obtained in the five years undoubtedly depend experimental farm in a year by up to 70%, other factors and the percentage remained divided. Production increase because of exceptional 2010 made up to 35%. We can say that soybean genotypes have a good behavior even in the harshest climate conditions of experimental years. ONIX variety performed very well both in the classical and at the lower works, productions made of over 2500 kg / ha. Harvest quality is closely linked to external inputs and values of oil, protein and fibers are similar values in the two tillage systems.

Key words: soybean yield, minimum tillage, conventional system of work

Introduction. Minimal soil work have become in the past 20 years a constant concern for Romanian agriculture, representing a viable alternative to sustainable agriculture in the area including Transilvanian Plain. Nowaday the conservative work define extremely varied processes. (GUȘ and all, 2008). Besides the conventional agriculture(with ploughing, preparation of the soil and seeding) and conservative agricultural system (no tillage) there are a planty methods of work of certain specific soil conditions, machinery or even traditions. An effective application of the conservative agriculture system at ARDS Turda on land located mostly on the slopes, with clay content more than 44%, in experimental years 2005 and 2006, revealed that for soybean, the slopes must till. Therefore we changed the no tillage system in minimum tillage system, that is now indicated.

Aims and objectives. All the time, when the experiment was in progress at ARDS Turda, we have in view the effect of system of agriculture in obtaining the soybean production obtained in those two systems , and their quality. The research was also focused on the quantity of nutrients which is optimum for soybean culture in two systems of agriculture presented above. Another problem studied was the effect of treatements on vegetation, that was made with different combination of pesticides and herbicide in different stages of plant development. All these factors presented above, are studied in correlation with soil conditions and wheelter evolution in the period of soybean development.
Materials and methods. The experiment carried out at SCDA Turda, has two systems of soil work: a conventional system (with ploughing, preparation of the soil and seeding), and another system, a minimum tillage system (with cisell and direct seeding), in rotation in three years: widt-maize –soybean. In the experiment four variants of treatments, were utilised in three specific stages of plant development and two levels of fertilization. The variety of soybean was Onix, a soybean variety created at ARDS Turda. The experiment was realized in three repetition. In conventional system the soil was ploughed with PP4-30 plough at 28 cm, prepare the soil with rotary harrow HRB 403D, and seeding with Directa – 400. In minimum tillage system the soil was broken with cisell Pinocchio 2.5 at 35 cm and just seeding with Directa 400. The distance from rows was 18 cm. The fertilizer were applied in two variants: one with N40P40 simultaneously with seeding, and the second variant with N40P40 simultaneously with seeding and N40P40 in 3-4 leaves phases of plants development. The seeds were applied with pesticide Yunta 246 FS : 2.0 l/to. Four treatments in three distinguish phase of plant development: 3-4 leaves, the florising phase, the beginning of pods appearance. The treatement was applied in accordance complex recipe a complex recipe with foliar fertilizer, fungicides, insecticides, to control the pests and bugs. Against weeds herbicides were used in another treatments period. Chemical treatments are the single method for control the pests. From this point of view this method of cultivation is not a sustenable system. (CARLIER and all, 2006) The wheather conditions in the period has been very different in this five years of work. Temperature was higher then average (on 55 years), in each years in vegetation period of soybean. Precipitation has been very different from one year to another. The 2009 and 2011 was a dry period, 2010 was very rainy and 2007 and 2008 was aproximatively normal, although much warmer in vegetation period. From climatic point of view, the year 2010 had exceptional conditions for soybean yield.

Results and discutions. The production obtained in this five years of work, depended greatly on aspect. Yield increase in 2010 with 2503 kg/ha higher than witness year 2007, means 62.4%. In the dry year 2011, the increase of the production was high 644 kg/ha means 41.7%. Differences are very significant. The system of soil work has a significant influence in the range of production. Values of yield obtained in minimum tillage system are influenced by a better management of the water in soil. The variety of soybean Onix, has a good performance in severally conditions of cultivation.

Conclusions. The influence of the system of work of the soil is noticable in the level of production which is higher in minimum tillage system conventional system of work with approximatally 17.4%. In minimum tillage system of work the production expenses are lower about 10% than in conventional system because any technological sequence are abandoned. The crop quality depends on the external contribution. The values of oil and fibers are approximately same values in bouth system of the soil work. In technological system with minimum tillage, the degradation of the soil by erosion and compactation are reduced.

REFFERENCES