



CERTIFIED  
CROP ADVISER

# Planting Depth of Corn

By Murray Van Zeggelaar, CCA

There are many factors of corn production such as temperature, precipitation, heat units and certain diseases that are considered beyond our control. Other areas, such as tillage, hybrid selection, planting date, insecticides and herbicides, are considered to be “controllable” in corn production. One area of corn production management that seems to get overlooked every year is proper planting depth of corn. There are various approaches used by growers to determine planting depth of corn. Some use the “plant into moisture” approach, where they typically start out planting shallow and continue to plant deeper as the spring progresses, if it happens to be a dry year, or continue to plant shallow in a wet spring. Others use the size of the seed to determine planting depth. The assumption here is that large sized seed has more reserves and therefore can be planted deeper and smaller seed needs to be planted shallower because of decreased vigor. Still others use the method of just hoping that it gets planted at the proper depth because they really can’t control it very well when they are planting at 10 mph. The fact is planting depth is probably one of the most important “controllable” factors in corn production.

Lets start with the development and physiology of the corn plant from the time it is planted through to the development of the brace roots. The corn seed germinates if favorable moisture and temperature exist. During germination, the radicle grows downward to anchor the seedling and absorb water. The mesocotyl elongates and pushes its way toward the soil surface. When it

reaches the surface and receives sunlight, it stops elongating and the plumule leaves emerge. At the same time that the mesocotyl is elongating, seminal roots are emerging from the seed. Together with the radicle, they make up the primary (initial) root system. At the time of the development of the first true leaf, usually 2-3 days after emergence, nodal roots have begun to emerge from just above the 3<sup>rd</sup> node. The nodal root system continues to develop with every node and by about the 5<sup>th</sup> leaf stage, it is the major supplier of water and nutrients. By the 10-leaf stage this root system can be 18 inches deep and 15 inches wide, growing at an angle of 25 to 30 degrees from the horizontal. At approximately the 16-leaf stage, brace roots are initiated from the lowest node above the soil surface and within 5 or 6 days, reach and penetrate the soil surface.

## First and foremost, planting depth is important for proper root development

Planting too shallow causes the nodal root system to develop at or just below the soil surface. This can lead to rootless corn whereby the plant is anchored only by the mesocotyl. Secondly, brace root development can be adversely affected and proper anchoring into the soil not achieved. The end result of shallow planted corn is a plant that is subject to lodging with little or no stress!

The other major problem with this shallow root system is herbicide injury. Most soil-applied herbicides are designed to penetrate into the top one inch of the soil, either through incorporation or rainfall. As mentioned above, the nodal root system of shallow planted corn

tends to be right in this region, leading to herbicide injury from chemicals such as dicamba and prowl. The easiest and most affective control for injury from soil-applied herbicides is proper planting depth!

## Another problem encountered with shallow planted corn is frost protection

Under normal circumstances, corn is tolerant to frost up to the 6-leaf stage. This is because the growing point of the plant remains below the soil surface up to this point. The problem with shallow planting is that the growing point emerges much sooner than the 6-leaf stage and making the plant susceptible to frost. Your best frost protection for early-planted corn is proper planting depth!

Last but not least, I will discuss the effects of planting depth and uneven emergence on yield. Corn planted too shallow or too deep tends to emerge unevenly. Studies have shown that uneven emergence can cause up to a 20 bushel per acre loss in yield. This loss in yield is due mainly to problems with pollination that occurs when plants of different physiological maturity are in the same field. Maximize yields with proper planting depth and even emergence!

In conclusion, planting depth is one of the most important “controllable” factors when planting corn. What is the proper planting depth? The ideal planting depth under all conditions is 1-1/2 to 2-1/2 inches (3.8 cm to 6.4 cm). Planting at this depth for all moisture conditions, tillage systems, seed sizes and herbicide programs will start your field off on the right foot every time.



CERTIFIED  
CROP ADVISER

*Murray Van Zeggelaar is a Certified Crop Adviser employed as an Area Manager with Sylvite Agri-services Ltd. based in Norwich.*

*There are over 500 Certified Crop Advisers (CCA) in Ontario. Each CCA has demonstrated their knowledge about Ontario crop production by passing the required exams. In addition, they have the crop advisory experience, the education, the commitment to continuing education and have signed a comprehensive code of ethics, which places the grower's interests first.*

*This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCAs.*