

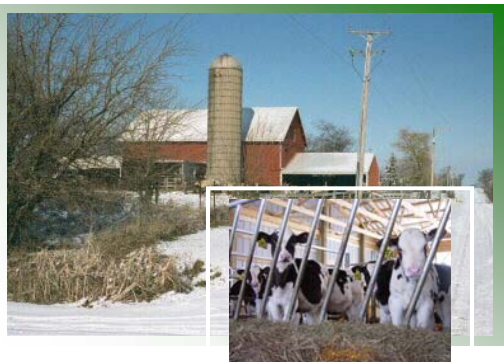
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Agronomics with livestock in mind!



Mitigate the Downside Risks of Corn Following Corn ~

Continuous corn cropping systems can be fraught with a multitude of negative yield-influencing factors (Butzen, 2006; Lauer et al., 1997; Nafziger, 2004; Vyn, 2004). Research indicates (Erickson & Lowenberg-DeBoer, 2004) that among the concerns there was an average yield loss of 9% for continuous corn, with overall yield losses ranging from 2-23%. Of 26 studies reviewed, only two cited yield advantages to continuous corn.

Most producers understand the potential for lower yields with continuous corn and agronomists generally do not promote monoculture of any kind. However, there are ways to diminish the downside risks of planting corn following corn for producers who feel the need to do so.

CORN RESIDUE ISSUES ~ A continuous corn cropping system generates a tremendous amount of crop residue from corn stubble and cobs. The amount of residue that remains is roughly equal to the weight of the grain harvested from the field. The risk and magnitude of the yield drag associated with corn following corn is greatest with high-residue no-till or minimum tillage systems. Among factors contributing to this yield drag are 1) greater levels of disease inoculum, 2) cooler, wetter soils during and after planting, 3) interference with planter row units, 4) wetter soils during and after harvest, and 5) decreased efficacy of soil-applied herbicides.

Cooler, wetter soils during or after planting may result in planter sidewall compaction, delayed corn germination and emergence, delayed seed growth rate, and increased exposure time to soil-borne diseases and insects prior to full establishment. Additionally, residue may interfere with the planting, causing uneven seed depths and seed-to-soil contact. Many residue-related challenges may be reduced by using stalk choppers or knife rolls on combine corn heads, avoiding no-till planting on top of the old corn rows, and selecting hybrids with good disease resistance, emergence, and seeding vigor traits.

NITROGEN FERTILITY ISSUES ~ Nitrogen rates for corn following corn are higher than for corn following legumes (including soybeans) and range from 30-50 lbs additional N required per acre (Butzen, 2006; Vitosh et al., 1995; Vyn, 2004). When these facts are coupled with the oft-cited lower yield potential of continuous versus rotation corn, the higher required optimum N rates for continuous corn "adds insult to injury." Producers need to remember to factor in higher N requirements for corn following corn, and possibly high N prices when developing comparative budgets for alternative crop rotations.

PHOSPHORUS & POTASSIUM FERTILITY ISSUES ~ Corn removes more soil phosphorus and less potassium per acre than soybean (Vitosh et al, 1995). A one-time move to

second-year corn will have negligible effects on P and K soil fertility levels. Over a number of years of corn following corn, however, producers should obviously monitor soil P and K levels and adjust accordingly. Pay particular attention to soil K levels, as this nutrient is especially needed for maintaining strong, healthy stalks.

STAND ESTABLISHMENT ISSUES ~ High levels of corn residue in continuous corn cropping systems often translate into difficult stand establishment conditions due to slow soil warming and drying poorly drained soils. High levels of residue can also interfere with the furrow opening and closing functions of corn planters (Nielsen, 2003). Not only can residue delay germination and emergence, it can also delay seedling development. Delayed stand establishment lengthens the potential period of seedling exposure to seedling-related blights and insects, thereby increasing the risk of lower than desired populations and/or higher numbers of weakened plants that are less able to tolerate late-occurring stresses. Producers need to select hybrids with superior emergence and seedling vigor ratings. There are also numerous ways to deal with corn residues, helping to minimize the possible negative impact this can have on any stand.

DISEASE & INSECT RISK ~ The risk of disease is greater when corn follows corn, especially when some form of reduced tillage is practiced that leaves a greater amount of non-decomposed, inoculum-bearing residue on the soil surface. Two diseases that can be a particular concern include gray leaf spot and northern corn leaf blight. Numerous other diseases are also possible. Careful selection of hybrids that show resistance to specific diseases is probably the most beneficial approach.

INSECT RISK ~ The major insect threat to corn following corn can be corn rootworm. Greater levels of corn residue create a climate conducive to various insect problems. This also includes numerous secondary soil pests such as wireworms, seedcorn maggots, white grubs and slugs, to name a few. The judicious use of insecticides and insecticide seed treatments or transgenic resistance in specific hybrids can be beneficial in mitigating insect problems on corn-following-corn fields. Foliar treatments may also be effectively used, when applied at the optimum time.

(edited from an article by Purdue University, Dept. of Agronomy)

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