

Nitrogen management of *Brassica carinata* for Optimum Seed Yields

Nitrogen is the most limiting nutrient for carinata production. Therefore, the correct rate of N applied at the right time can result in substantial economic return for growers. A deficiency of N is associated with reduced growth and yield, while N input exceeding crop requirements can lead to leaching of nitrates to waterbodies.

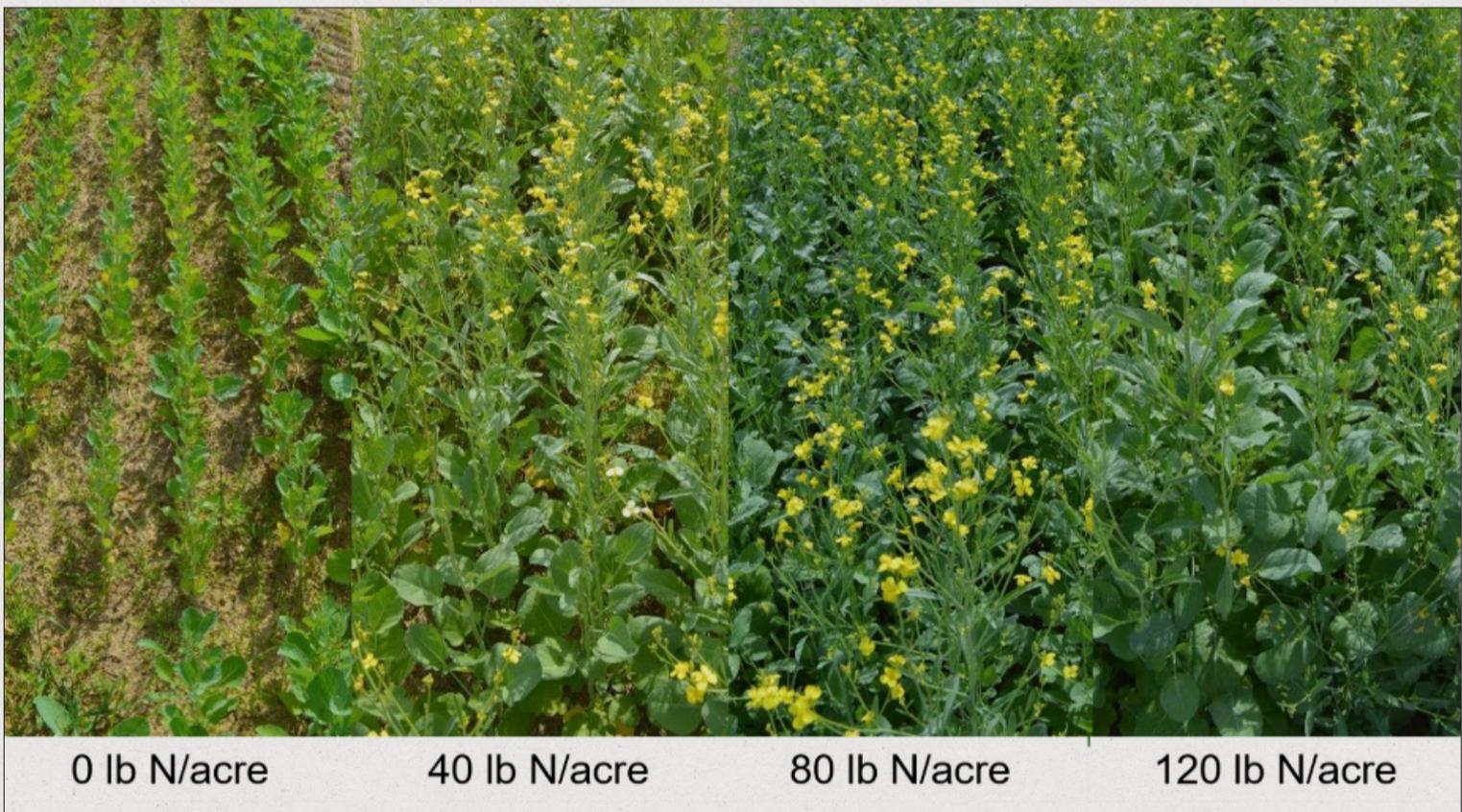


Figure 1: Carinata growth and development is responsive to nitrogen fertilizer application.

N rate

Extension in the Southeast (SE) recommends 80 lbs N/ac as a three-way split application (20 lbs N/ac pre-plant, 40 lbs N/ac at bolting, and 20 lbs N/ac at flowering) on loamy fine sandy soils (Seepaul et al., 2019). Recent unpublished N studies conducted on sandy loam soils over a geographical area representative of southern coastal plain soils (2 site-years in FL and 3 site-years in GA) have shown that carinata seed yield responds significantly up to 120 lbs N/ac. This indicates that the optimal N needed for carinata growth and yield in the SE may vary with soil type and location. However, industry contracts should also be considered when making N related decisions, as value of the grain is connected to both the levels of applied N and also form of N used.

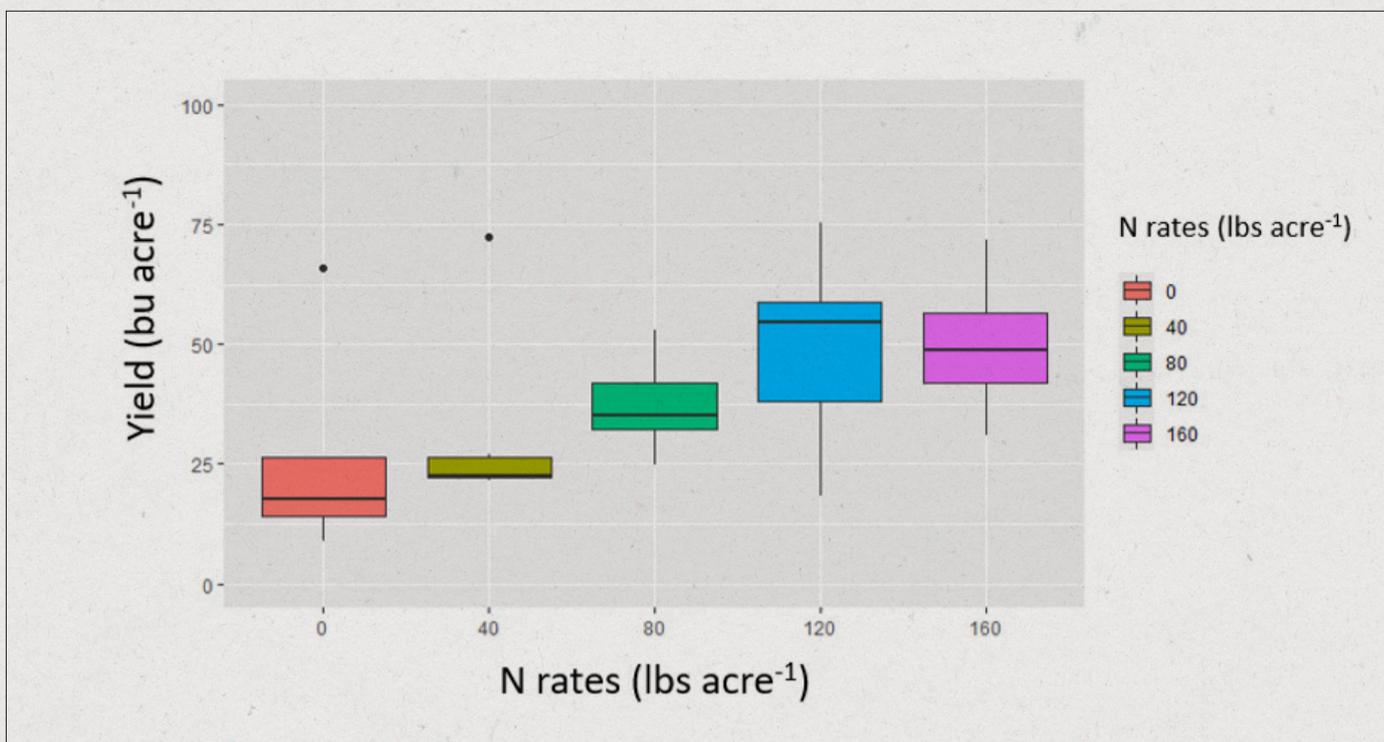


Figure 2. Carinata seed yield response to nitrogen application rates across two site- years during the 2017-2018 and 2018-2019 growing seasons in Florida.

N timing

N application should ideally be synchronized with N uptake during key growth stages. While a single at-plant application of N might reduce the cost of production by saving an application cost, it also increases the window for N leaching before the crop can take up significant amounts of N, especially on sandy soils of the southeast US, especially given the slow initial growth and uptake of carinata during the winter.

Research in Georgia determined optimal N application timing during the 2018-19 season at three sites. Maximum yield was obtained under a two-way split application performed at planting (20 lbs N/ac) and at pre-bolting (100 lbs N/ac) compared to a single application (at-plant or pre-bolting) or a three-way split application (at-plant, pre-bolting, and bolting). At-plant application of approximately 20% of the total seasonal N budget ensures that carinata gets sufficient N to reach the pre-bolting phase without N stress. At early bolting, nutrient demand by carinata rapidly increases, especially N. For this reason, it is recommended that all N is applied prior to bolting.

It is also important to note that these recommendations should be taken in conjunction with industry contracts which may restrict levels of synthetic N applications, and incentivize rotations with residual N from previous crops as well as use of manure or poultry litter to maximize yield, as these practices increase the value of the grain. The data presented in this factsheet along with industry contract specifications should enable growers to make management decisions that will maximize economic returns for grain produced in their rotations.

Reference:

Seepaul, R., Marois, J., Small, I. M., George, S., & Wright, D. L. (2019). Carinata dry matter accumulation and nutrient uptake responses to nitrogen fertilization. *Agronomy Journal*, 111(4), 2038-2046.