

FOLIAR NITROGEN APPLICATIONS WITH FULVIC ACID

Highlights

- Canola and pea
 - Same emergence and test weight in all treatments compared to control
- Wheat
 - Emergence was greater in plots where fulvic acid and N were applied in furrow and in plots where N was applied in furrow and foliar
 - Foliar and in furrow application of N and foliar and in furrow application of N and fulvic acid had the least lodged individuals
- Canola, pea and wheat yield were unaffected by foliar and in-furrow applications of nitrogen

Treatment	Urea (N) pounds acre ⁻¹	Urea with Fulvic acid (FA) pounds acre ⁻¹
	Wheat	
Control (in-furrow N)	150	0
In furrow N + Fulvic Acid	0	150
In-furrow N; Foliar N	80	0
In furrow N + Fulvic Acid Foliar N + Fulvic Acid	0	80
In furrow N + Fulvic Acid Foliar N + Foliar Nitro + Fulvic Acid	0	80

Treatment	Canola	
	Urea (N) pounds acre ⁻¹	Urea with Fulvic acid (FA) pounds acre ⁻¹
Control (in-furrow N)	175	0
In furrow N + Fulvic Acid	0	175
In-furrow N; Foliar N	105	0
In furrow N + Fulvic Acid Foliar N + Fulvic Acid	0	105
In furrow N + Fulvic Acid Foliar N + Foliar Nitro + Fulvic Acid	0	105

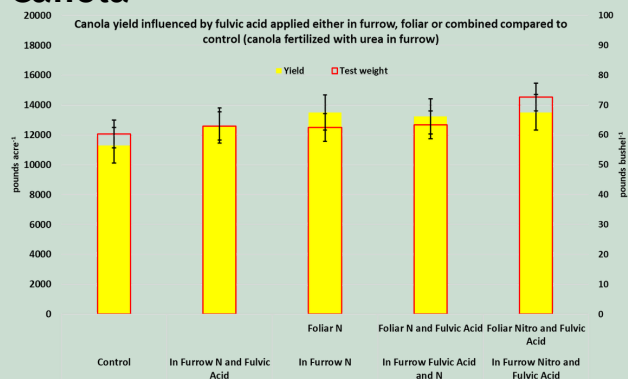
Treatment	Peas	
	Urea (N) pounds acre ⁻¹	Urea with Fulvic acid (FA) pounds acre ⁻¹
Control (No Urea)	0	0
Foliar Fulvic Acid	0	0

Results for our research came with a few shortcomings this season. Biomass samples sent for plant analysis were futile because samples did not survive the trip to the laboratory facilities in Ontario despite our efforts to preserve its entirety.



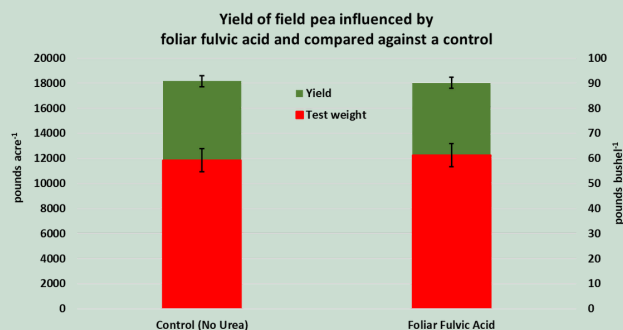
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Canola



There was no effect of foliar application in field pea on parameters such as emergence ($P=0.0782$), number of stands ($P=0.6851$), survivorship ($P=0.1498$), yield ($P=0.5181$) and test weight ($P=0.4169$). It is possible that more fulvic acid with or without N should be considered or that more than on foliar application either as an N + fulvic acid or only as fulvic acid is pertinent to see significant results.

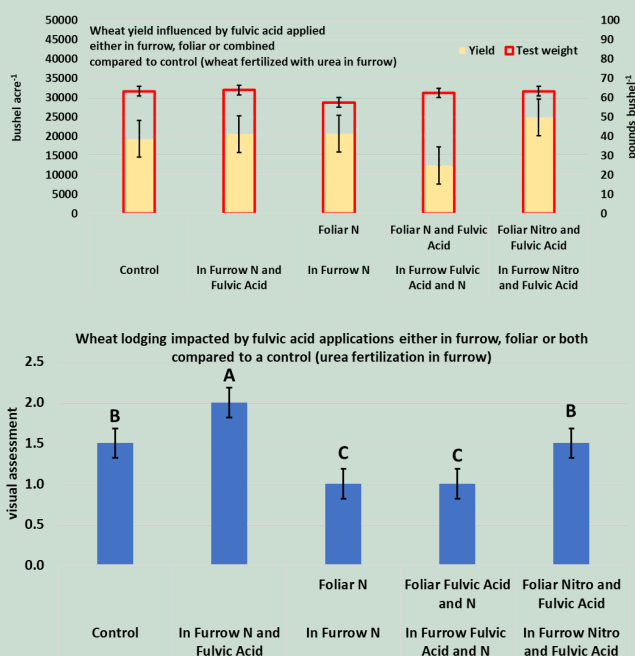
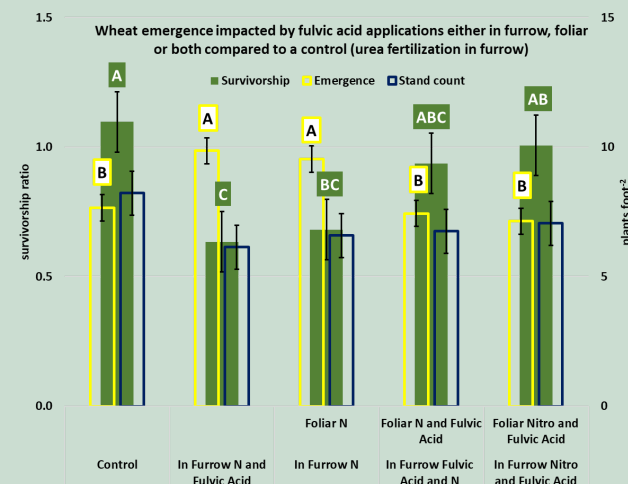
Pea



There was no impact of foliar application in field pea on parameters such as emergence ($P=0.8421$), number of stands ($P=0.4540$), survivorship ratio ($P=0.4975$), yield ($P=0.9397$) and test weight ($P=0.6559$). It is possible that this requires a greater concentration of either N and/or fulvic in either furrow or foliar form, or that more than one foliar application is necessary.

Wheat

Number of stands ($P=0.5059$), yield ($P=0.5001$) and test weight ($P=0.3849$), protein content ($P=0.1975$) are the same. In contrast number of emergent plants ($P=0.0003$), survivorship ratio ($P=0.0301$), and lodging ($P=0.0038$) were impacted by treatment applications.



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Wheat

N applications in furrow with either in furrow fulvic acid or N applied to the leaves promoted more emergence compared to the other treatments. Number of emergent plants was 15% greater in treatments where N was applied in furrow and foliar compared to treatments where N and fulvic acid were applied in furrow or with furrow with additional foliar applications. There was 26% more emergence if N and fulvic acid were applied in furrow compared to tankmixed applications of either N or nitro plus fulvic acid in furrow and foliar. Moreover, wheat stands subjected to N applications in furrow and foliar had 24% more emergence than those wheat stands with either N or Nitro in furrow and foliar tankmixed with fulvic acid. On the same note, survivorship (number of stand counts divided by number of emergent seedlings) was 26% greater in control plots (wheat fertilized with urea in furrow) compared to the other treatments. Treatments where either N or Nitro were tank mixed with fulvic acid and applied both in furrow and foliar, had a 35% greater survivorship ratio than wheat growth with sole applications of N and fulvic acid in furrow and 30% greater survivorship than wheat subjected to in furrow and foliar N applications.

Wheat stands subjected to furrow and foliar N applications and wheat stands with foliar and N applications in furrow and foliar lodged less than those wheat stands where N and fulvic applications in furrow took place. Lodging was 33% greater in all treatments where N and Fulvic acid were applied in furrow regardless of whether or not fulvic acid and either N or Nitro were applied on the leaves. Lodging was also 38% more likely if N and fulvic acid were applied in furrow only.

Overall, it can be argued that in furrow N applications increase emergence but eventually numbers can be increased with in furrow fulvic acid and complemented with tank mixes of N plus fulvic acid. In this way. Although this is not reflected in number of wheat stands, survivorship ratios in treatments where fulvic and N mixes added in furrow and on the leaf surface were as high as that found in plots where N in furrow was applied as the only soil amendment. This may also explain why lodging was also high in these treatments. As plants acquired all these amendments, they likely became heavier in number and weight which may have caused more lodging compared to wheat plants where N and fulvic acid only took place close the seed. This however had no ultimate impact in yield, protein or test weight which may suggest for either a greater concentration of fulvic acid in furrow, or foliar, or multiple foliar applications.