Higher inputs of Nitrogenous fertilizer in tobacco production: a Boon or Bane

Introduction:

Production of any crop is accompanied by inputs of fertilizer, especially, Nitrogen. Nitrogenous fertilizer is very essential in tobacco production. Proper nitrogenous fertilization and timing of application is always recommended to the farmers for a better yield.

Hypothesis:

As the Nitrogen input increases, the yield increases proportionally, provided; all other management practices are kept the same.

Experimentation:

I would choose a small piece of land from my field, that was fallowed for at least 2 years. Prior to planting, I will take the soil samples, at random from the proposed testing plot, to the soil testing lab to know the actual Nitrogen available in the soil, to make sure that the prior conditions are met (uniformity of the soil).

Normally, Nitrogen is applied to the tobacco 3 times during the cropping season. One at the transplant time, applied with the transplant water, second one after 25-30 days after transplanting, during the first plow (to boost the uptake of the nitrogen with the loosening of the soil) and the third one during the layby period (40-45 days after transplanting), to boost up the crop growth (the stage at which the plant actually spreads its leaves and the nicotine builds up in the leaves-hardening of the leaves). In addition to this, to test the hypothesis, in the higher Nitrogen input plots, it is applied two times before layby and twice the input after layby to boost the vegetative growth.

Over view of the experimental treatments:

Treatment 1: Normal application of Nitrogen, as recommended by the cooperative extension service.
Treatment 2: Three times higher input of Nitrogen, in the form of three additional applications.
Treatment 3: No nitrogenous fertilizer, used as a control to make the actual increase in the yield.

To conduct this experiment, I would divide the plot into 12 equal plots, 4 plots for each treatment (replicates) and transplant the tobacco with uniform density. Randomly, select the test plots and application of Nitrogen is done as per the treatments discussed above.

Results that disproves the hypothesis:

On flue-cured tobacco, excessive rates of nitrogen delay crop maturity and make the tobacco a more favorable host for hornworms and aphids late in the season – this shows that the excessive
inputs of Nitrogen actually attracts the insect pests. As the insect management practices undertaken are similar in both the normal and high levels of nitrogen input plots, there will be considerable reduction in the yield in the plots that are associated with high N inputs.

Excessive nitrogen keeps the leaves green for a longer period of time and promotes excessive sucker growth that favors aphid infestation, which normally begins late in the season. So, over accumulation of the nitrogen that was applied to the plants will increase the aphid population and there by incurring additional costs, reducing the net returns to the farmer.

**Results that supports the hypothesis:**

The excessive input of nitrogen is very helpful, as it actually boosts the leaf production in the first half of the season. As tobacco is harvested at a regular intervals of time (as the leaves mature), the first pick by the farmer will show a positive trend towards the yield. As the first pick is the best one in the season which can give a better price, he will get a positive return; even if the aphid infestation is severe late in the season, which drastically reduces the vegetative growth irrespective of the nitrogen application.

**Hypothetical Data:**

<table>
<thead>
<tr>
<th>N Rate</th>
<th>I Harvest</th>
<th>Pest population</th>
<th>II Harvest</th>
<th>Pest population</th>
<th>III Harvest</th>
<th>Pest population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal rate of N</td>
<td>85</td>
<td>45</td>
<td>85</td>
<td>60</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>Higher rate of N</td>
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<td>50</td>
<td>70</td>
<td>45</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>No N input</td>
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<td>60</td>
<td>55</td>
<td>65</td>
<td>45</td>
<td>80</td>
</tr>
</tbody>
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