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AGRONOMY NOTES

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GROWTH RESPONSE OF KENHY FESCUE TO NITROGEN FERTILIZER

K. L. Wells, R. C. Buckner, George Armstrong, Paul Gray, and C. E. Wyatt

Kenhy fescue is a new, improved variety of tall fescue which has recently been released by the University of Kentucky Agricultural Experiment Station and the U.S.D.A. Agricultural Research Service (see University of Kentucky publication AGR-60, "Kenhy - A New Tall Fescue Variety"). Seed of this variety should become available to farmers in limited quantities in the summer 1977. The purpose of this report is to provide information on how this newly developed fescue variety produces as affected by time and rate of nitrogen application.

Data reported are from 3-year studies conducted in western Kentucky (Graves Co.) on a Grenada soil, in central Kentucky (Franklin Co.) on an Elk soil, and in eastern Kentucky (Breathitt Co.) on an Allegheny soil. Seedlings were made of Kenhy and Ky 31 tall fescue at each site during the fall of 1970, and plots were managed for hay production during 1971-73. Soil tests were taken at each site and lime, phosphate, and potash were applied as needed to adjust soil pH and supply adequate levels of phosphate and potash. Treatments (shown in the tables) were replicated 3 times, and each site was clipped 3 times per year. The nitrogen and clipping schedule was: (1) half the total amount of nitrogen used was topdressed onto plots in mid-March of each year, (2) plots were clipped the first time each year when seed heads first started emerging from the boot (mid-May), (3) they were allowed to regrow until mid-August when they were clipped the second time, (4) the remaining half of nitrogen was topdressed immediately after the mid-August clipping, and (5) plots were then allowed to regrow until temperature was cold enough to stop further growth (mid-November), at which time they were clipped for the third and final time each year. All nitrogen was applied as prilled ammonium nitrate.

Dry matter yields for each clipping are shown in Table 1. Although differences in total annual dry matter yields were not great, there was a consistent trend for Kenhy to outyield Ky 31 (Figure 1). The differences in dry matter production were greater in favor of Kenhy during the summer growth period, a reflection of one of the genetic improvements in Kenhy as contrasted to Ky 31 (Figure 2). The data also show how use of early spring applied nitrogen can affect spring and summer production. In addition to greatly increasing growth during the spring period, summer growth was also increased progressively from the 40 pound N to the 120 pound N rates applied in mid-March.

Fall growth was also increased by the mid-August topdressing with nitrogen. This increased fall growth from use of nitrogen coupled with a 2-3 fold increase in sugar content during late fall provides the basis for the "fescue stockpiling" program which has developed in Kentucky.

In addition to improving growth of cool season grasses, addition of nitrogen to a grass sward improves content of protein in the herbage. Table 2 shows the total nitrogen content in the herbage of Kenhy and Ky 31 as affected by time and rate of nitrogen fertilizer. As the data indicate, there was little difference between the two varieties in herbage content of total nitrogen. Protein production per acre relates directly to dry matter yields and herbage nitrogen content. When crude protein production is calculated from yield and nitrogen content data, there is little difference between the two varieties for total annual production (Figure 3), but summer production of crude protein (Figure 4) by Kenhy is consistently higher than Ky 31, largely reflecting the better summer dry matter production. These studies have shown that Kenhy fescue responds very similarly to Ky 31 fescue when fertilized with nitrogen, the largest difference being in somewhat better summer production of dry matter by Kenhy.

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Table 1. Effect of Nitrogen on Dry Matter Yields (lbs/A) of Kenhy and Ky 31
Tall Fescue (3-Yr Av.)

| LOCATION | -Total lbs N/A/Yr ^{1/} | | | | | | | | | |
|---|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|-------|
| | 0 | | 80 | | 160 | | 240 | | 320 | |
| | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 |
| - FIRST CLIPPING (MID-MAY) - | | | | | | | | | | |
| Eastern Ky | 1648 | 1547 | 3072 | 3096 | 3886 | 3763 | 3782 | 3823 | - | - |
| Central Ky | 1255 | 1424 | 3396 | 3597 | 3426 | 3699 | 3344 | 4016 | - | - |
| West Ky | <u>1216</u> | <u>1369</u> | <u>3772</u> | <u>3287</u> | <u>3956</u> | <u>4197</u> | <u>4332</u> | <u>4274</u> | 4187 | 4102 |
| Av 3 sites | 1373 | 1447 | 3413 | 3327 | 3756 | 3886 | 3819 | 4038 | | |
| - SECOND CLIPPING (MID-AUGUST) - | | | | | | | | | | |
| Eastern Ky | 2580 | 2373 | 3232 | 3080 | 3783 | 3791 | 4237 | 4114 | - | - |
| Central Ky | 1477 | 1442 | 2358 | 2136 | 2536 | 2291 | 3525 | 3501 | - | - |
| West Ky | <u>989</u> | <u>854</u> | <u>1776</u> | <u>1305</u> | <u>1706</u> | <u>1300</u> | <u>2973</u> | <u>2081</u> | 3213 | 2748 |
| Av 3 sites | 1682 | 1556 | 2455 | 2174 | 2675 | 2461 | 3578 | 3232 | | |
| - THIRD CLIPPING (MID-NOVEMBER) - | | | | | | | | | | |
| Eastern Ky | 920 | 804 | 1376 | 1348 | 1916 | 2040 | 1916 | 1876 | - | - |
| Central Ky | 821 | 605 | 2447 | 2220 | 2913 | 2916 | 3315 | 3281 | - | - |
| West Ky | <u>583</u> | <u>370</u> | <u>1771</u> | <u>1697</u> | <u>2817</u> | <u>2250</u> | <u>2136</u> | <u>2299</u> | 2156 | 2410 |
| Av 3 sites | 775 | 593 | 1865 | 1755 | 2555 | 2402 | 2456 | 2485 | | |
| - TOTAL ANNUAL PRODUCTION (3 CLIPPINGS) - | | | | | | | | | | |
| Eastern Ky | 5148 | 4724 | 7680 | 7524 | 9585 | 9594 | 9935 | 9813 | - | - |
| Central Ky | 3553 | 3471 | 8201 | 7953 | 8893 | 8906 | 10184 | 10798 | - | - |
| West Ky | <u>2788</u> | <u>2593</u> | <u>7319</u> | <u>6289</u> | <u>8479</u> | <u>7747</u> | <u>9441</u> | <u>8654</u> | 9556 | 9260 |
| Av 3 sites | 3830 | 3596 | 7733 | 7255 | 8986 | 8749 | 9853 | 9755 | | |

^{1/} half topdressed in mid-March; half topdressed in mid-August immediately after 2nd clipping.

Table 2. Effect of Nitrogen Fertilization on Nitrogen Content (%) of Kenhy and Ky 31 Tall Fescue Herbage.

| LOCATION | - Total lbs N/A/Yr ^{1/} - | | | | | | | | | |
|-------------|------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|-------|
| | 0 | | 80 | | 160 | | 240 | | 320 | |
| | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 | Kenhy | Ky 31 |
| | - FIRST CLIPPING (MID-MAY) - | | | | | | | | | |
| Eastern Ky | 1.80 | 1.70 | 1.86 | 2.00 | 2.41 | 2.43 | 2.69 | 2.58 | - | - |
| Central Ky | 1.64 | 1.66 | 1.98 | 2.11 | 2.37 | 2.51 | 2.83 | 2.86 | - | - |
| West Ky | <u>1.63</u> | <u>1.61</u> | <u>1.95</u> | <u>1.85</u> | <u>2.06</u> | <u>2.03</u> | <u>2.51</u> | <u>2.58</u> | 2.69 | 2.68 |
| Av. 3 sites | 1.69 | 1.66 | 1.93 | 1.99 | 2.28 | 2.32 | 2.68 | 2.67 | | |
| | - SECOND CLIPPING (MID-AUGUST) - | | | | | | | | | |
| Eastern Ky | 1.61 | 1.66 | 1.65 | 1.62 | 1.68 | 1.65 | 2.00 | 1.78 | - | - |
| Central Ky | 1.80 | 1.89 | 1.50 | 1.62 | 1.59 | 1.67 | 1.51 | 1.48 | - | - |
| West Ky | <u>1.51</u> | <u>1.58</u> | <u>1.52</u> | <u>1.48</u> | <u>1.42</u> | <u>1.48</u> | <u>1.41</u> | <u>1.55</u> | 1.49 | 1.62 |
| Av. 3 sites | 1.64 | 1.71 | 1.56 | 1.57 | 1.56 | 1.60 | 1.64 | 1.60 | | |
| | - THIRD CLIPPING (MID-NOVEMBER) - | | | | | | | | | |
| Eastern Ky | 1.84 | 1.74 | 1.98 | 1.94 | 2.27 | 2.29 | 2.75 | 2.60 | - | - |
| Central Ky | 1.58 | 1.74 | 1.68 | 1.68 | 1.98 | 1.93 | 2.37 | 2.38 | - | - |
| West Ky | <u>1.59</u> | <u>1.57</u> | <u>1.86</u> | <u>1.74</u> | <u>2.10</u> | <u>2.04</u> | <u>2.41</u> | <u>2.34</u> | 2.67 | 2.37 |
| Av. 3 sites | 1.67 | 1.68 | 1.84 | 1.79 | 2.12 | 2.09 | 2.51 | 2.44 | | |

^{1/} half topdressed in mid-March; half topdressed in mid-August immediately after 2nd clipping.

Figure 1. Effect of Nitrogen Fertilization on Annual Dry Matter Production by Kenhy and KY 31 Tall Fescue.

Total Dry Matter
(Lbs/A/Yr)

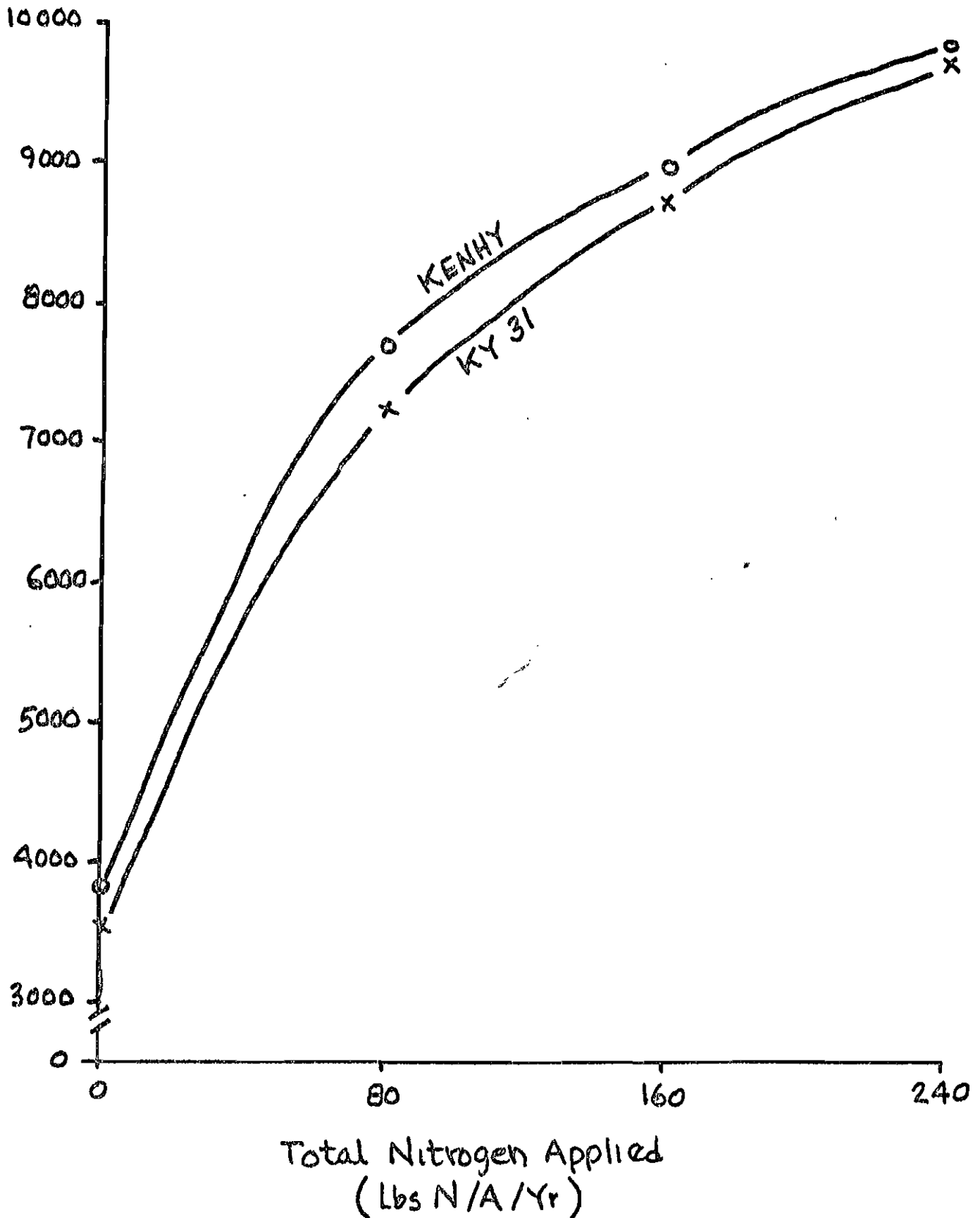


Figure 2. Effect of Spring Topdressing of Nitrogen on Summer Growth of Kenhy and KY 31 Tall Fescue.

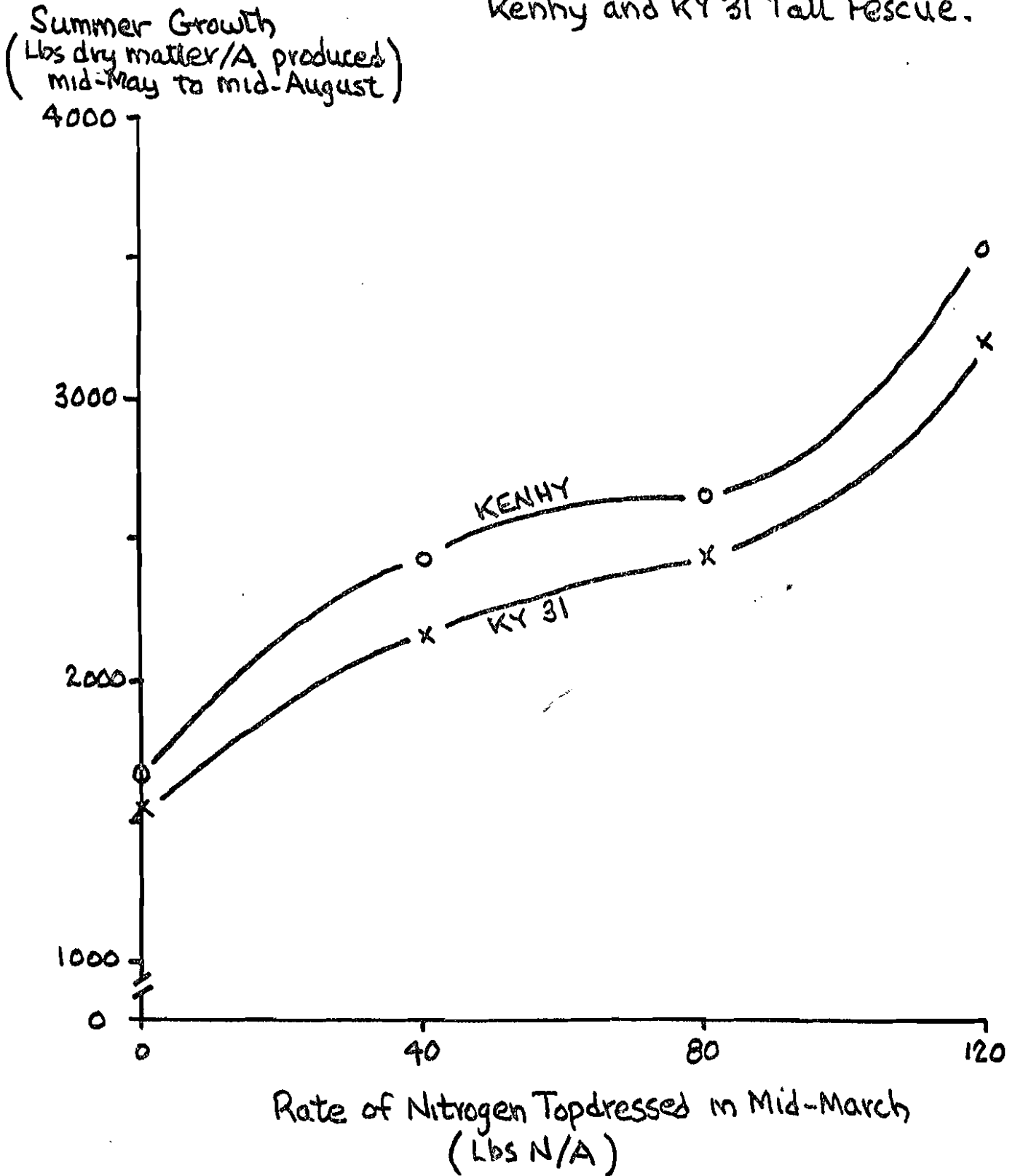


Figure 3. Effect of Nitrogen Fertilization on Crude Protein Production by Kenhy and Ky 31 Tall Fescue.

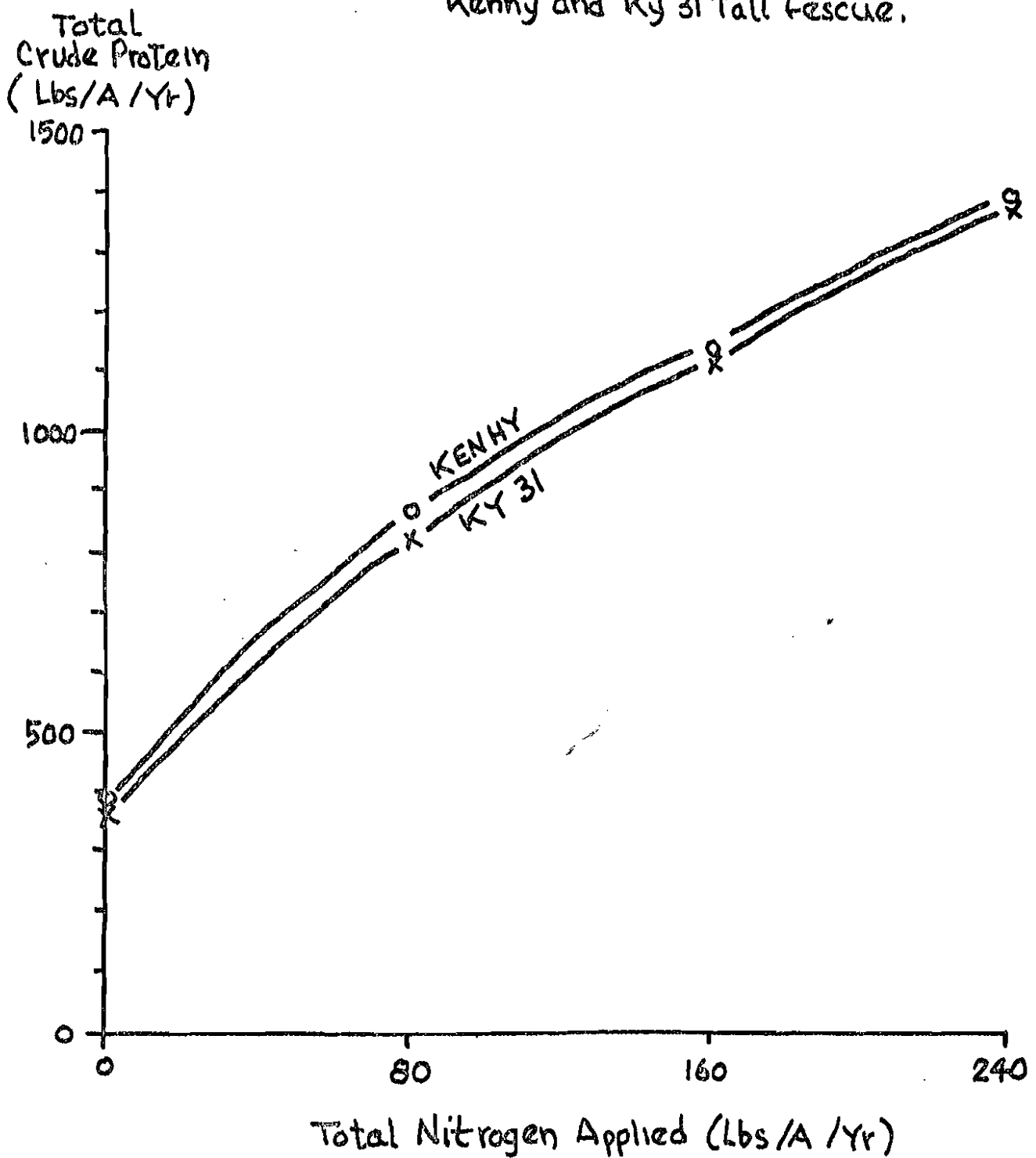
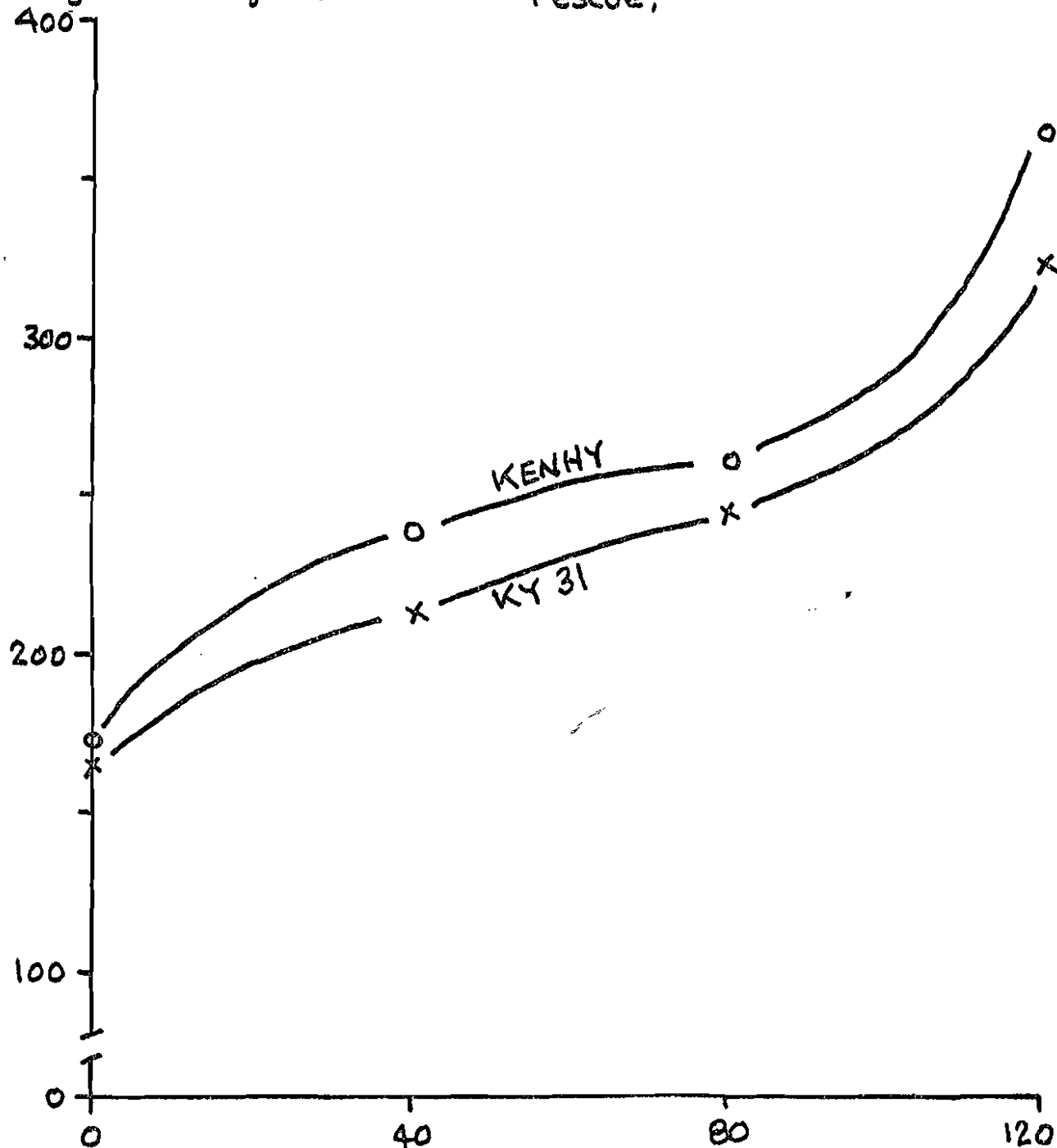


Figure 4. Effect of Spring Topdressing of Nitrogen on Summer-Time Crude Protein by Kenhy and KY 31 Tall Fescue.

Crude Protein
Lbs/A produced
Mid-May to Mid-August)



Rate of Nitrogen Topdressed in Mid-March
(Lbs N/A)