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Kenneth L. Wells
University of Kentucky

Robert C. Buckner
University of Kentucky

George Armstrong
University of Kentukcy

Paul Gray
University of Kentucky

C. E. Wyatt
University of Kentucky

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
Lexington, Kentucky 40506

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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. Seedings 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.

Kenneth L. Wells, Extension Specialist
in Agronomy

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

	-Total lbs N/A/Yr[1/]									
	0		80		160		240		320	
LOCATION	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	1216	1369	3772	3287	3956	4197	4332	4274	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	989	854	1776	1305	1706	1300	2973	2081	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	583	370	1771	1697	2817	2250	2136	2299	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	2788	2593	7319	6289	8479	7747	9441	8654	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.

	- Total lbs N/A/Yr[1/] -									
	0		80		160		240		320	
LOCATION	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	1.63	1.61	1.95	1.85	2.06	2.03	2.51	2.58	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	1.51	1.58	1.52	1.48	1.42	1.48	1.41	1.55	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	1.59	1.57	1.86	1.74	2.10	2.04	2.41	2.34	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.

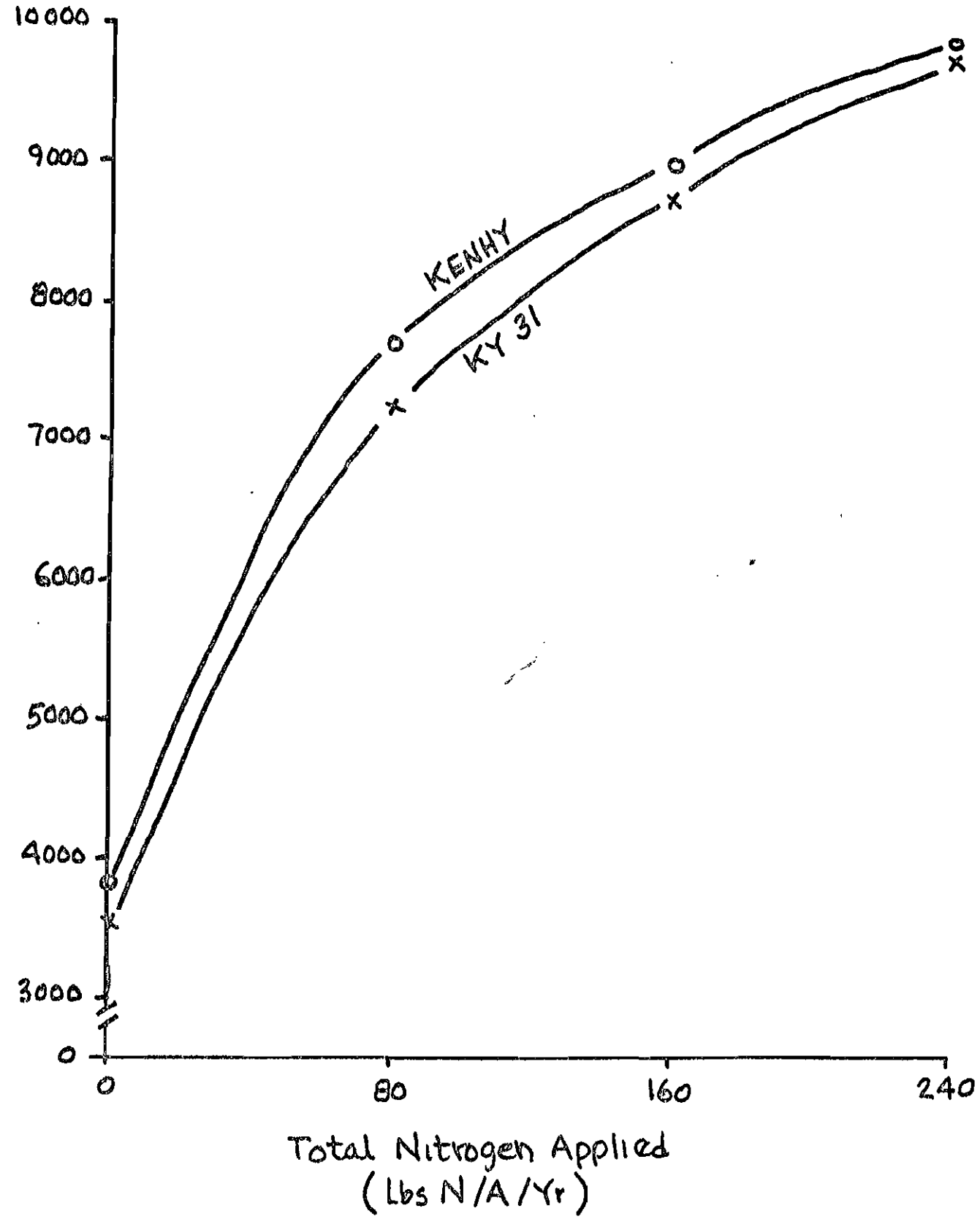

Figure 2. Effect of Spring Topdressing of Nitrogen on Summer Growth of Kenhy and KY 31 Tall Fescue.

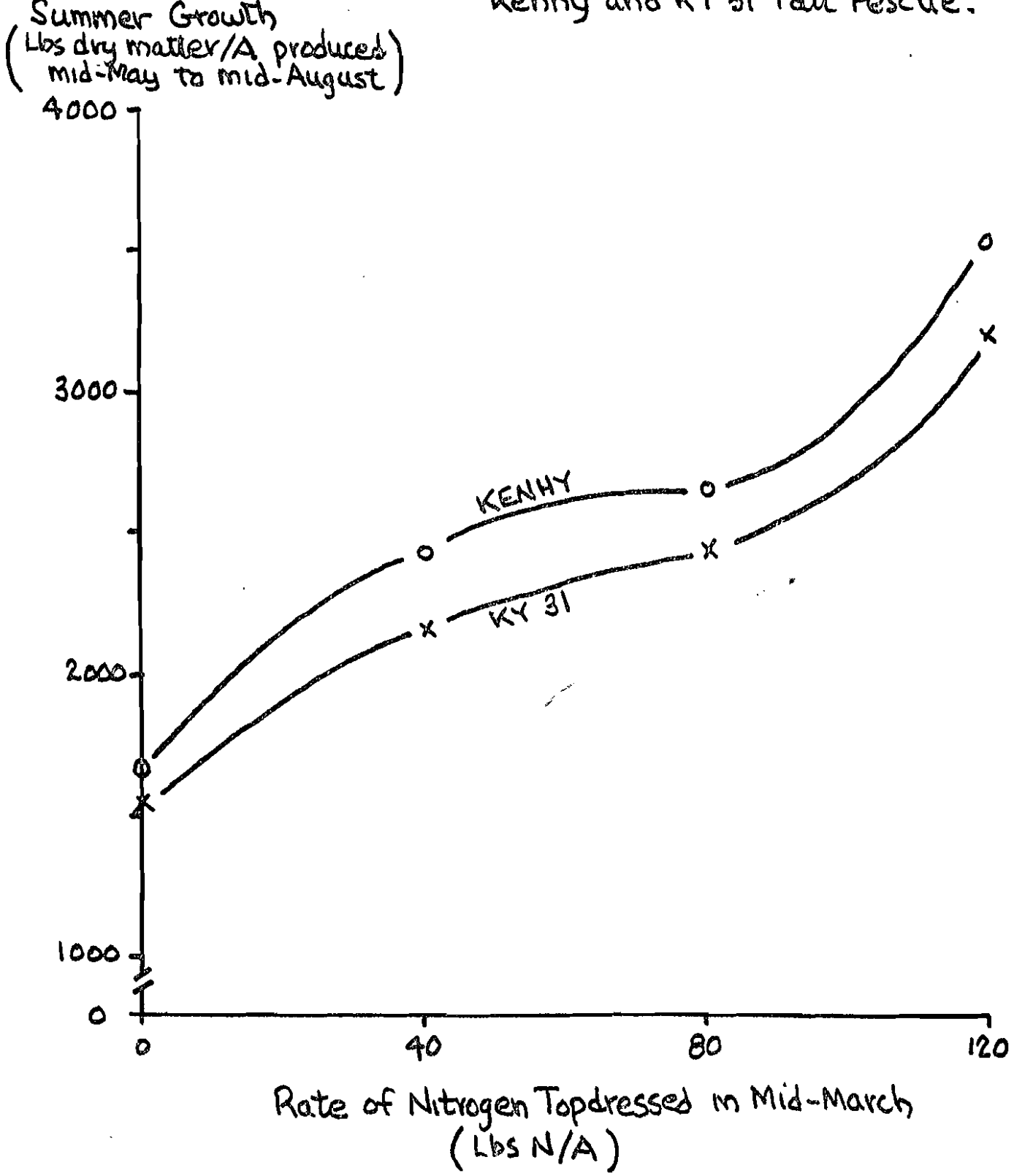

Figure 3. Effect of Nitrogen Fertilization on Crude Protein Production by Kenny and Ky 31 Tall Fescue.

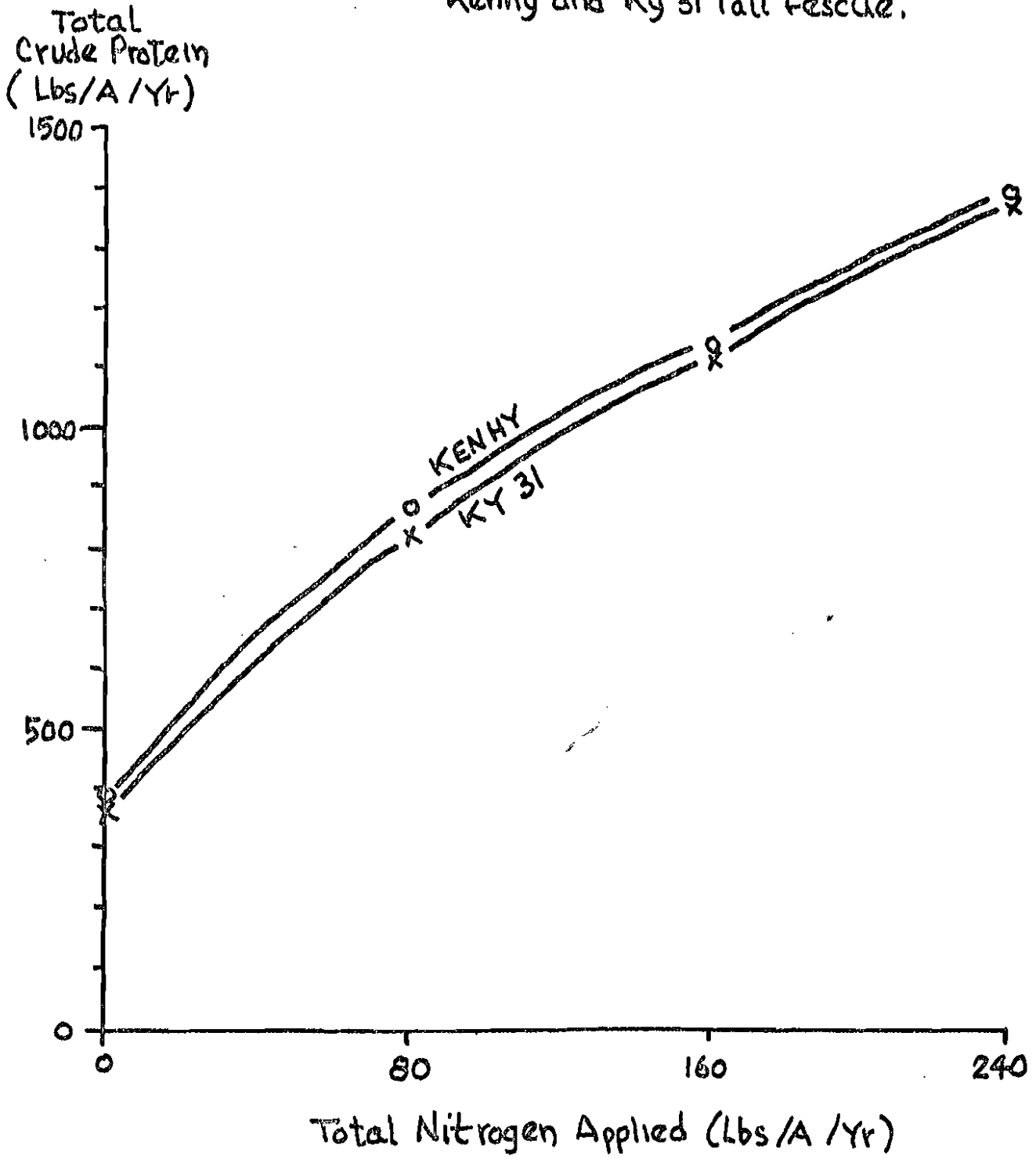

Figure 4. Effect of Spring Topdressing of Nitrogen on Summer-Time Crude Protein by Kenhy and KY 31 Tall Fescue.