EFFECTS OF SEEDING RATE ON DRY MATTER YIELD OF TWO FORAGE RAPE VARIETIES

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INTRODUCTION

Husby and Krieg (1987) reported that average Alaskan forages were deficient in energy for beef cattle and protein levels were marginal for growing animals. Both the energy and protein of Alaskan forages are low for lactating dairy cows (Brundage and Herlugson, 1984). Energy and protein concentrates are imported to Alaska from elsewhere in the U.S. High transportation costs make these imported feedstuffs expensive for Alaskan livestock producers.

Brassica crops, such as rape (*Brassica napus* L.) and turnips (*B. rapa* L.) have been widely studied as forage crops because they have the potential to produce high yields of excellent quality forage. Jung et al. (1986) demonstrated this potential when they reported that *Brassica* spp. yielded 4-7 tons DM/A and the forage was highly digestible (80-90% in vitro dry matter digestibility). Crude protein was relatively low for turnip roots (8-12%), but top growth was high (up to 27%). Lambert et al. (1987) found that the quality of *Brassica* spp. was too high for optimum performance of growing lambs. They reported that it was necessary to include some coarse feed, such as grass hay, to increase the fiber content in the diets of these animals.

The potential of *Brassica* crops has been investigated in Alaska (Mitchell and Krieg, 1985; Panciera et al., 1990). The yield and quality of these crops in Alaska were similar to the levels observed in the Lower 48 states. Basic agronomic information is needed in order to develop management recommendations for *Brassicas* in Alaska. Research is underway to define the nitrogen and phosphorus fertilizer requirements (Panciera et al., 1990). This report summarizes the results of a two year study concerning the effects of seeding rates on dry matter yields of two *Brassica* hybrids.

MATERIALS AND METHODS

Two varieties of rape, Tyfon and Winfred, were planted at two locations in 1989 (Pt. MacKenzie and Palmer) and 1990 (Pt. MacKenzie and Matanuska Farm). Both varieties are called "rape,"

but they are *Brassica* hybrids. Tyfon is a cross between chinese cabbage and turnip (*B. pekinensis* L. X *B. rapa* L.). Tyfon is a leafy crop that resembles chinese cabbage, but it produces turnip-like roots. Winfred is a cross between kale and turnip (*B. oleracea* X *B. rapa* L.). The growth habit of Winfred is similar to kale or fodder rape (upright growth, stem, no bulbous root). Four replicates of 5 x 20 ft plots were planted at each location each year. Seeding rates were 1.5, 3.0, 4.5, and 6.0 lb pure live seed (PLS) per acre. Seeds were planted in 6 inch rows at a depth of 1/4 to 1/2 inches. Fertilizer applications consisted of 135 lb N per acre, 270 lb P_2O_5 per acre, and 270 lb K_2O per acre. Plots were sampled for yield at 47, 75, and 103 days after planting (DAP). Rainfall and temperature data are presented in Figures 1 and 2 while soil test data are presented in Table 1.

RESULTS

The effects of seeding rate on the two varieties were similar. The average response is presented in Figure 3. Seeding rates had the greatest impact on the first sampling date, 47 DAP. Yields increased as seeding rates increased up to 4.5 lb per acre. Differences among treatments declined as the growing season advanced. The lowest seeding rate, 1.5 lb per acre, resulted in the lowest DM yield 75 DAP, but there were no differences in

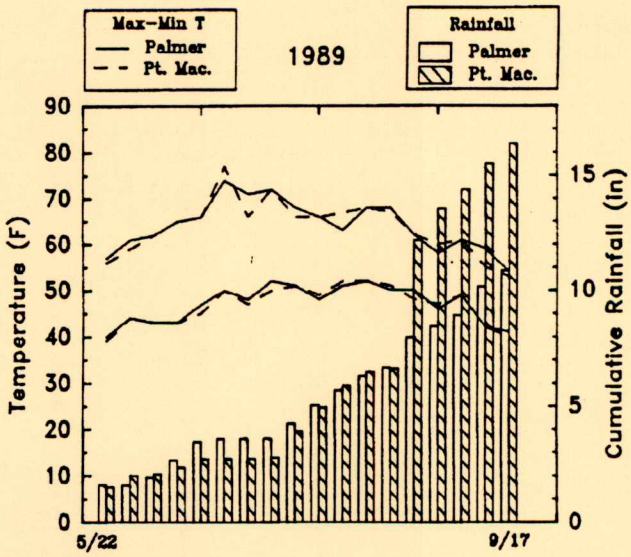

Fig. 1. Max-min temperatures and cumulative rainfall for the 1989 growing season at Palmer and Point MacKenzie, AK.

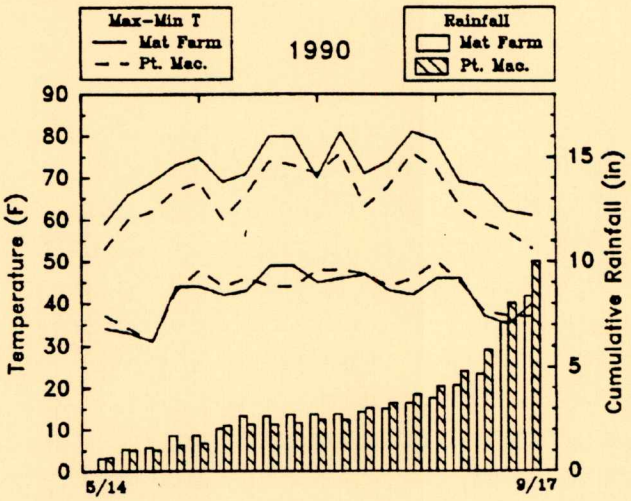

Fig. 2. Max-min temperatures and cumulative rainfall for the 1989 growing season at the Matanuska Research Farm and Point MacKenzie, AK.

Table 1. Soil chemical characteristics by location and year.

	Sampling depth	Organic Matter	pH	EC	NO_3+NH_4 N	P*	K*
	in	%		mmho/cm	ppm		
Palmer '89	0-6	6.0	5.9	0.28	4	177	122
Point MacKenzie '89	0-6	10.5	5.2	0.27	16	9	114
Matanuska Farm '90	0-12	4.6	5.4	0.54	20	234	347
Point MacKenzie '90	0-12	5.6	5.6	0.08	3	4	47

*Mehlich 3 extraction

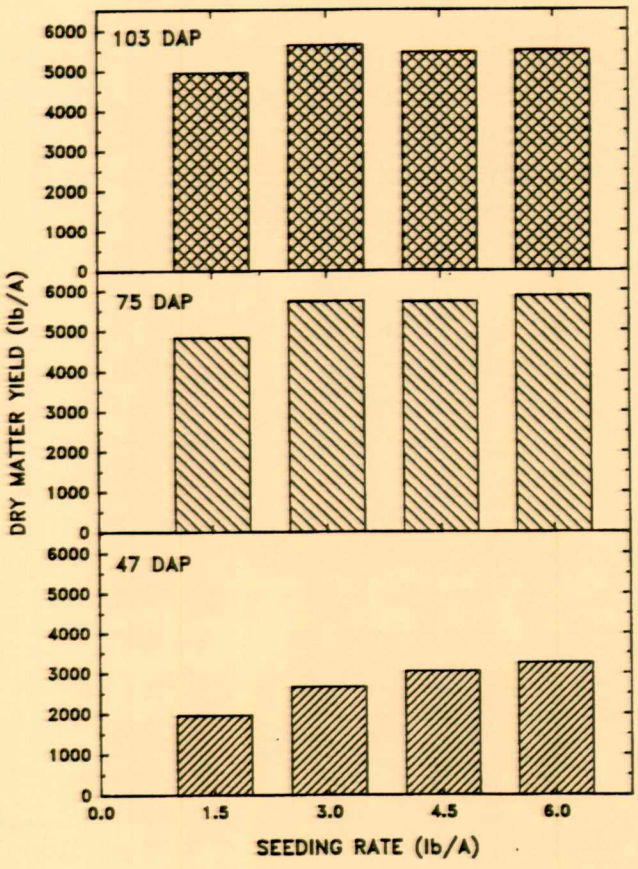

Fig. 3. Effects of seeding rates on dry matter yield of Winfred and Tyfon rape at three intervals after planting.

yield for rates above 3 lb per acre. On the final sampling date, 103 DAP, seeding rates did not significantly influence yield.

Stand counts were taken early in the growing season, approximately three weeks after planting. The data are summarized in Figure 4. The highest yielding treatments (47 and 75 DAP) had plant populations of 8 to 10 plants/ft². A seeding rate of 4.5 lb per acre is equivalent to 18 seeds/ft², so the mortality was about 55%.

PRACTICAL IMPLICATIONS

Based on this work, a seeding rate of 4.5 lb/A appears to be adequate for drilled stands of these varieties. We did

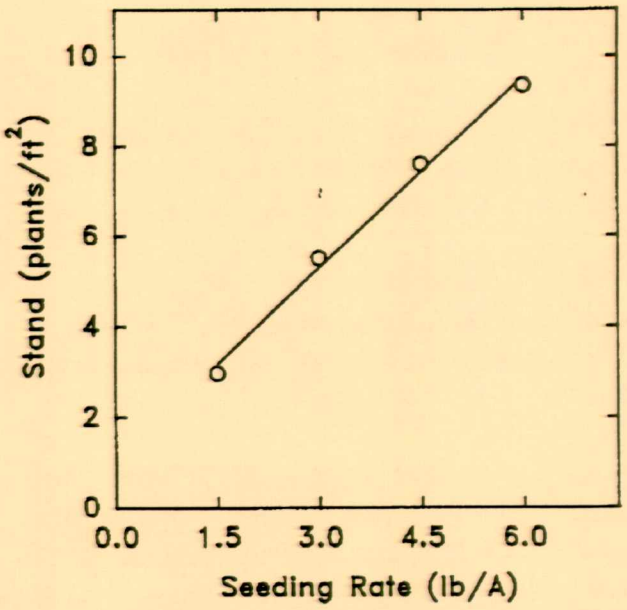

Fig. 4. Effects of seeding rates on plant populations of Winfred and Tyfon rape at three weeks after planting.

not observe any yield depression at the 6 lb/A rate, but seeding rates in excess of 6 lb/A may reduce yields. The above results should only be used as a guide, since they do not pertain to other situations, such as a heavy pest load, different planting methods, or other *Brassica* crops (turnips, rutabagas, kale). Seed and seedling mortality is normally higher for broadcast planting, but it is difficult to predict the amount by which seeding rates should be increased. Producers should be cautious because ideal seeding rates are low relative to other crops and the seed flows freely. A small error in planter adjustment could result in a doubling of seeding rate.

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