**Determine Optimum Agronomic Practices to Maximize Productivity of 'Pacific Gold' Oriental Mustard and 'Kodiak' Brown Mustard**
**2005**

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## ACCOMPLISHMENTS:

The effects of five available nitrogen rates (50, 75, 100, 125 and 150 lb available N/acre) and three seeding rates (5, 7.7, and 10.3 lbs/acre) on the field performance of Pacific Gold and Kodiak was determined at two locations (Moscow and Genesee) from early and late planting dates in spring 2005.

Prior to planting, soil samples were taken to determine base nitrogen level. Nitrogen treatments were added such that total available nitrogen was 50, 75, 100, 125, and 150 lb N/acre. The experimental design of the complete trial at each site was a strip-split plot design with three replicates (i.e. 2 planting dates x 2 cultivars x 5 nitrogen levels x 3 seed rates x 3 replicates = 180 plots/site). Plant growth was monitored throughout the growing season and variables recorded included plant stand counts, flower start date, and plant height. At harvest, seed from each plot was harvested and weighed. Quality analysis to determine oil content and seed weight using a sub-sample of seed from each plot is currently underway.

Averaged over all planting dates, sites, nitrogen application rates and seeding rates, Pacific Gold produced 1,465 lb/acre of seed while Kodiak yield was significantly reduced at 1,205 (Table 1). Pacific Gold flowered significantly earlier, and plants were 4 inches shorter at maturity than Kodiak.

***Table 1. Seed yield, plant stand counts, days from planting to 50% bloom, and plant height of Pacific Gold and Kodiak Oriental mustard cultivars, averaged over all treatments.***

| Cultivar | Seed yield | Plant stand | Days to Flower | Plant height |
|---|---|---|---|---|
| | -- lb/acre -- | - count/ft - | --- days --- | -- in -- |
| Pacific Gold | 1,465 [a] | 10.0 | 51.7 [a] | 53 [b] |
| Kodiak | 1,205 [b] | 9.3 | 51.1 [b] | 56 [a] |
| LSD 5% | 49.1 | n.s. | 0.14 | 0.7 |

Means within columns assigned different superscript letters are significant (P<0.05).

Increased nitrogen application had significant impact on seed yield (Table 2). The relationship between nitrogen application and seed yield was significantly linear for both cultivars. Pacific Gold, however, had a greater nitrogen response than Kodiak (Figure 1). Increasing nitrogen application rate by 1 lb/acre resulted in a 6.9 lb/acre increase in Pacific Gold seed yield while 1 lb/acre increase in nitrogen application related to only a 5.2 lb/acre yield increase in Kodiak. As would have been expected, increased nitrogen application resulted in significantly taller plants.

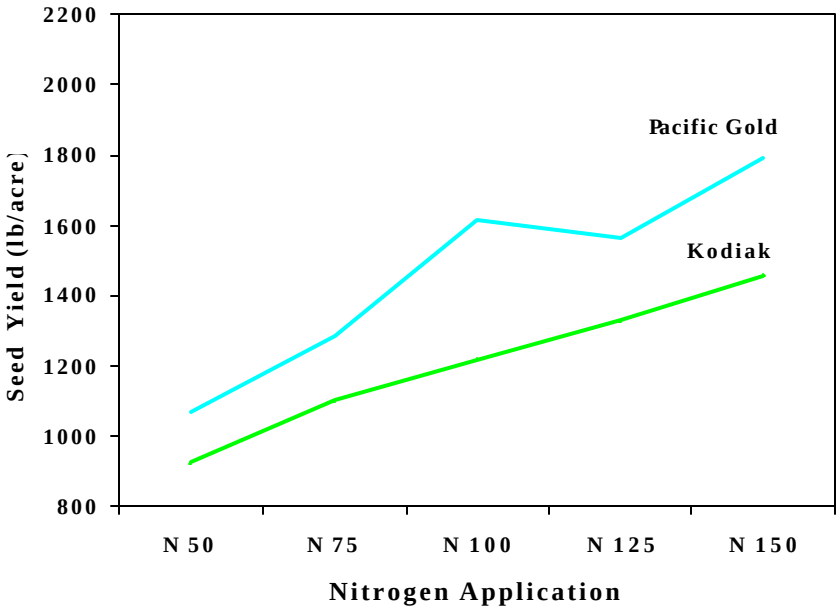
***Table 2. Seed yield, plant stand counts, days from planting to 50% bloom, and plant height after application of five nitrogen rates averaged over all treatments.***

| Nitrogen Rate | Seed yield | Plant stand | Days to Flower | Plant height |
|---|---|---|---|---|
| | -- lb/acre -- | - count/ft - | --- days --- | -- in -- |

| | | | | |
|---|---|---|---|---|
| 50 lb N | 996 [d] | 9.7 | 51.5 | 50 [c] |
| 75 lb N | 1,193 [c] | 9.6 | 51.3 | 53 [b] |
| 100 lb N | 1,414 [b] | 8.6 | 51.4 | 66 [ab] |
| 125 lb N | 1,449 [b] | 10.5 | 51.4 | 56 [ab] |
| 150 lb N | 1,621 [a] | 9.8 | 51.4 | 58 [a] |
| LSD 5% | 147 | n.s. | n.s. | 2.6 |

Means within columns assigned different superscript letters are significant (P<0.05).

***Figure 1. Yield response of Pacific Gold and Kodiak to increased nitrogen.***




No significant difference in yield was observed when the seeding rate was increased from 5 lb/acre to 10.3 lb/acre (Table 3). As expected, higher seedling stand counts were associated with increased seeding rates. Plants from the highest seeding rate treatment flowered less than a half-day earlier on average than the 7.7 and 5 lb/acre rates and were shorter, likely due to decreased resource availability per plant.

Seed yields from early seeding dates were significantly higher for both cultivars compared to seeding 14 days later (Table 4). Averaged over both cultivars, seed yield from the early plantings produced 1,436 lb/acre while later planting yield was 14% lower at 1,234 lb/acre. The yield decrease at the later planting date was likely related to the later dates having a shorter period from planting to flowering than was observed with the early planting. Later planting was related to significantly lower seedling stand counts, in contrast to 2004 when the later planting date had higher seedling stand counts. The difference is likely due to crusting shortly after planting in 2005.

***Table 3. Seed yield, plant stand counts, days from planting to 50% bloom, and plant height of three seeding rates averaged over all treatments.***

| Seeding rate | Seed yield | Plant stand | Days to Flower | Plant height |
|---|---|---|---|---|
| | -- lb/acre -- | - count/ft - | --- days --- | -- in -- |
| 5.0 lb/acre | 1,342 | 6.0 [c] | 51.7 [a] | 57 [a] |
| 7.7 lb/acre | 1,349 | 10.4 [b] | 51.4 [b] | 54 [b] |
| 10.3 lb/acre | 1,310 | 12.6 [a] | 51.2 [b] | 53 [c] |

| | | | | |
|---|---|---|---|---|
| LSD 5% | n.s. | 0.9 | .18 | 1.0 |

Means within columns assigned different superscript letters are significant (P<0.05).

***Table 4. Seed yield, plant stand counts, days from planting to 50% bloom, and plant height from early and late planting averaged over all treatments.***

| Planting date | Seed yield | Plant stand | Days to Flower | Plant height |
|---|---|---|---|---|
| | --- lb/acre --- | - count/ft - | --- days --- | -- in -- |
| Early | 1,436 [a] | 11.4 [a] | 55.2 [a] | 55 |
| Late | 1,234 [b] | 7.9 [b] | 47.6 [b] | 54 |
| LSD 5% | 142 | 1.5 | 0.2 | n.s. |

Means within columns assigned different superscript letters are significant (P<0.05).

## PROJECTIONS:

Industry and grower interest in Pacific Gold in northern Idaho has escalated dramatically since its release in 2001, and current interest is evident by the high demand to purchase certified seed this year. Although Kodiak has only just been commercially released we hope that this cultivar will offer PNW growers greater flexibility in end-use products in their rotation. However, this is the first research that has investigated the effects of seeding date, seeding rate or nitrogen on productivity of *B. juncea* mustard. It is difficult to make strong recommendations or conclusions based on two years of results and it is hoped to continue this type of agronomic research in future years. Results from this study are posted on the *Brassica* Breeding website http:/www.ag.uidaho.edu/brassica/. Although limited in scope, this information will help maximize productivity and grower profitability when producing Oriental mustard crops.

## PUBLICATIONS:

Determine optimum agronomic practices to maximize productivity of Oriental mustard (Brasscia juncea L.) in the Pacific Northwest. 2005. J. Olmstead, J. Brown, and J.B. Davis. American Society of Agronomy 98th Annual Meeting. November 6-10, 2005.

Determine optimum agronomic practices to maximize productivity of Oriental mustard (Brasscia juncea L.) in the Pacific Northwest. 2005. J. Olmstead, J. Brown, J.B. Davis, and D. Wysocki. Western Society of Crop Science Annual Meeting. June 19-22, 2005.

Determine optimum agronomic practices to maximize productivity of 'Pacific Gold' Oriental mustard and 'Kodiak' brown mustard. 2005. J. Olmstead, J. Brown, D. Wysocki and J.B. Davis. University of Idaho. http:/www.ag.uidaho.edu/brassica/.