

‘IdaGold’
Yellow Condiment Mustard
(*Sinapis alba* L.)

Morphology and Crop Quality

IdaGold has moderate-good seedling emergence. Plants are erect and stems are hollow. On average, IdaGold flowers 55 days after planting (Table 1), which was on average one day earlier than both AC Pennant and Tilney. IdaGold is most similar in appearance to the condiment yellow mustard cultivar ‘Tilney’. IdaGold is, however, significantly taller than Tilney (Table 2). Averaged over 23 site/years, IdaGold plants were 51 inches tall after flower ending, which was significantly taller ($P < 0.05$) taller than Tilney plants which averaged 47 inches tall. Over the 23 comparative trials IdaGold plants were significantly taller under 18 environments.

Averaged over years and sites, IdaGold produced 27% oil content, which was not significantly different from the two control cultivars (Table 3). Fatty acid profile of IdaGold is similar to both Tilney and AC Pennant (Table 4). Glucosinolate content and mucilage content is the leading quality factor in yellow mustard. 1000-seed weight is moderate-high and seed color is bright yellow.

Glucosinolate content in condiment mustard is directly related to pungency and IdaGold had significantly higher total glucosinolate content ($244 \mu\text{mol g}^{-1}$) than Tilney ($231 \mu\text{mol g}^{-1}$) (Table 5). Sinalbin (*p*-hydroxybenzyl glucosinolate) accounted for the greatest proportion (97%) of total glucosinolate. The 28:1 ratio of sinalbin to progoitrin (2-hydroxy-3-butenyl glucosinolate), in IdaGold, was similar to the ratio for Gizilba (32:1). IdaGold has a seed oil fatty acid profile not significantly different from either Gizilba or Tilney. Mucilage content is a determination of the viscosity of liquid used to boil mustard seeds. Mucilage content is IdaGold is significantly and markedly higher (better quality) than in any of the alternative cultivars available (Table 6). IdaGold mucilage content was more than doubled compared to AC pennant and Tilney (considered as a quality standard).

Agronomic Performance Trials

IdaGold is an open-pollinated cultivar selected for high adaptation to the dry-land environments of the Pacific Northwest (Idaho, Oregon and Washington). Agronomic performance of IdaGold was compared to AC Pennant and Tilney in replicated field trials planted in Idaho, Washington and Oregon in between 1996 and 2002. AC Pennant and Tilney account for the largest proportion of all yellow mustard grown in North America.

IdaGold is the first condiment yellow mustard (*Sinapis alba*) to be developed for the Pacific Northwest region and no local cultivars are available for comparison. All trial results from 1999 through 2002 were obtained from the Pacific Northwest Mustard Variety Trials.

IdaGold is highly resistant to lodging and seed shatter at maturity. In addition IdaGold is highly tolerant to cabbage flea beetle (*Phyllotreta cruciferae* (*Phyllotreta cruciferae* (Goeze) (Coleoptera: Chrysomelidae)), is highly resistant to diamondback moth (*Plutella xylostella* L.) and a wide range of aphids. In addition IdaGold is completely immune to cabbage seedpod weevil (*Ceutorhynchus assimilis* Paykull).

Seed yield potential of IdaGold in the inland Pacific Northwest region is excellent. When planted under conventional tillage systems, IdaGold average seed yield over 53 sites/years was 1482 kg ha⁻¹, which was not significantly different than Tilney (1427 kg ha⁻¹) (Table 7). Yield potential of IdaGold when planted in a direct seed system was similar at 1347 kg ha⁻¹, over 24 year/sites, but was not significantly higher under these situations than either Tilney or AC Pennant (1328 and 1311 kg ha⁻¹, respectively) (Table 8). IdaGold does, however, show good adaptation to direct seeding. IdaGold was entered into the Pacific Northwest Mustard Variety Trial between 1999 and 2002, over the 55 site/years of this trial; IdaGold was the highest yielding entry at 43 locations (i.e. over 78% of the sites tested).

Table 4. Fatty acid profile of IdaGold compared to two control cultivars.

Cultivar	16:0 ¹	18:0	18:1	18:2	18:3	20:1	22:1	24:1
----- % Total oil content -----								
IdaGold	3.0	1.1	28.1	10.2	10.3	11.1	31.7	2.1
Gizilba	2.6	1.2	29.6	9.5	8.2	11.8	33.3	1.2
Tilney	2.6	1.0	25.1	9.6	11.0	9.1	37.5	2.3
s.e.	0.04	0.02	0.42	0.14	0.06	0.08	0.56	0.04

¹ 16:0 = palmitic acid; 18:0 = stearic acid; 18:1 = oleic acid; 18:2 = linoleic acid; 18:3 = linolenic acid; 20:1 = eicosenoic acid; 22:1 = erucic acid; and 24:1 = nervonic acid.

Table 5. Glucosinolate profile and total glucosinolate content in the seed meal of IdaGold, and Tilney.

Cultivar	Progoitrin	Sinalbin	Total
----- $\mu\text{mol g}^{-1}$ -----			
IdaGold	8.46	235.59	244.05
Tilney	2.35	228.60	230.95
s.e.	0.20	3.95	4.06

Table 6. Mucilage content (viscometer constants: 629-0.02721, 566-0.03182) of IdaGold, Tilney and AC Pennant from performance trial 1999 to 2001.

Cultivar	Average	2001	2000	1999
IdaGold	65.8	71.6	77.5	48.2
Tilney	30.6	30.9	34.5	26.6
AC Pennant	32.3	33.3	36.1	27.8
LSD 5%	13.1	11.4	15.9	12.0

Table 7. Seed yield of ‘IdaGold’ and two control cultivars (‘AC Pennant’ and ‘Tilney’) evaluated from replicated field trials conducted on conventionally tilled soil between 1996 and 2002.

Cultivar	Weighted Mean	Rank	2002 (7 sites)	2001 (8 sites)	2000 (8 sites)	1999 (9 sites)	1998 (9 sites)	1997 (7 sites)	1996 (5 sites)
	-kg/ha-		----- kg ha ⁻¹ -----						
IdaGold	1482	1	1463	1578	1474	1631	1367	1493	1290
AC Pennant	*	-	1315	1724	1516	1683	*	*	*
Tilney	1427	2	1309	1594	1456	1590	1304	1478	1139
Grand mean	1455		1362	1632	1482	1635	1335	1486	1215
LSD 5%	n.s.		296	431	261	201	n.s.	n.s.	135

Table 8. Seed yield of ‘IdaGold’ and two control cultivars (‘AC Pennant’ and ‘Tilney’) evaluated from replicated field trials conducted under direct seeding systems between 1999 and 2002.

Cultivar	Weighted Mean	Rank	2002 (5 sites)	2001 (6 sites)	2000 (6 sites)	1999 (7 sites)
	-kg/ha-		----- kg ha ⁻¹ -----			
IdaGold	1347	1	1304	1354	1298	1417
AC Pennant	1311	3	1226	1253	1342	1426
Tilney	1328	2	1257	1382	1367	1307
Grand mean	1441	-	1262	1129	1336	1383
LSD 5%	n.s.	-	54	94	n.s.	108

n.s. non-significant difference between cultivars.