

**Results:**

1999 Field Measurements, Mustard and Wheat Straw

Biomass, carbon, and nitrogen yields (10/14/1999)

	Crop yield components					
	biomass	C	S	N	C:N	N:S
	-----lb DM/ac-----					
White mustard, <i>S. alba</i> <sup>1</sup>						
Martigena, combine track	6424	2764	16	107	26:1	6.7:1
Martigena, non-combine track	5272	2024	12	79		
Wheat straw	6733	2663	3	34	79:1	10.6:1
Mustard + Wheat Straw					41:1	

<sup>1</sup>Mustard planted Aug. 10, 1999

2000 Mustard Variety Trial

Biomass, carbon, sulfur, and nitrogen yields (10/23/00)

	Crop yield components					
	biomass <sup>2</sup>	carbon	sulfur	nitrogen	C:N	N:S
	-----lb DM/ac-----					
White mustard, <i>S. alba</i> <sup>1</sup>						
Martigena	4773 b	2061	40	119	17:1	3.0:1
Ida Gold	4177 b	1826	34	102	18:1	3.0:1
Tilney	5843 a	2526	59	157	16:1	2.7:1
Oriental mustard, <i>B. juncea</i> <sup>1</sup>						
Pacific Gold	5022 ab	2138	36	93	23:1	2.6:1

<sup>1</sup>Mustard planted second week of August, 2000

<sup>2</sup> Within columns, means followed by the same letter are not significantly different (LSD, 0.10)

**Results:**

2001 Green Manure Trial Yield Results <sup>1</sup>		
Harvested 10/24/01		
Variety	Ave. Dry Matter Yield -----lb/ac-----	Grouping <sup>2</sup>
Pacific Gold	10704	a
Cutlass	10540	a
Caliente	10062	ab
Absolut	9627	abc
Tilney	9331	abc
F-E75	8660	bcd
ISCI20	8557	bcd
Martigena	8433	bcde
Commodore	8121	cde
Vulcan	6988	def
Ida Gold	6685	ef
F-L71	6432	f

Variety (reps)	----lb/ac----	Comments
Maxi (3)	5334	Planted 8/28
Achilles (1)	2603	Planted 8/31
502 (3)	5287	Planted 8/21
I. Umbellata (4)	1301	Poor growth
Dwarf Essex (4)	4838	Poor stand

<sup>1</sup>Except where noted, four replications of each entry were planted on August 14th, 2001. Plots were 15' x 3.5'. Seeding rates in lbs/ac were as follows: *S. alba* @ 10, *B. juncea* @ 8, *R. sativus* @ 14, *I. Umbellata* @ 15, Caliente blend @ 10, and *B. napus* @ 10.

<sup>2</sup> Yields followed by the same letter are not significantly different according to LSD (0.10)

**Mustard Green Manures  
 On-farm Research Results  
 Measurement: Mustard and other  
 species biomass production**

**Results:**

2002 Green Manure Variety Trial Results	
Variety	Biomass, lb/ac
Fall Raab	9900
ISCI61	9467
Commodore/Caliente	8863
Martigena	8535
Commodore	8528
Absolut	7484
Caliente 105	7443
ISCI20	7134
Pacific Gold	6896
Ida Gold	6047
Carmen	5660
Belamn	5465
Nemat	5054
Means separation by PLSD at 0.10	
Variety	Fresh weight tons/ac
Commodore	57.5
Radish/Caliente	41.2
ISCI61	38.5
Fall Raab	32.2
Martigena	32.2
ISCI20	31.1
Pacific Gold	29.3
Caliente 105	29.2
Nemat	29.0
Absolut	26.1
Ida Gold	23.8
Belamn	23.7
Carmen	22.5
Means separation by PLSD at 0.10	

**Results:**

Green manure crops tested:

1 oriental mustard, *Brassica juncea*

2 white mustard, *Sinapis alba*

3 oilseed radish, *Raphanus sativus*

4 arrugula, *Eruca sativa*

Variety	Species	Dry Biomass, lb/ac	Grouping*	Submitted by
ISCI 20	1	9487	1	High Performance Seed
Cover	2	8303	2	High Performance Seed
Defender	3	7183	3	High Performance Seed
Luna	2	7103	4	High Performance Seed
Ames 19270	2	6902	5	WSU-USDA Germplasm Collection
Pacific Gold	1	6781	6	McKay Seed Inc./Genesee Union Warehouse
Caliente 119	1&2	6714	7	High Performance Seed
Absolvent	2	6631	8	High Performance Seed
2003-615	1	6608	9	High Performance Seed
ISCI 99	1	6570	10	High Performance Seed
Ida Gold	2	6541	11	McKay Seed Inc./Genesee Union Warehouse
Absolut	2	6185	12	High Performance Seed
2003-84	1	6139	13	High Performance Seed
PI 458934	1	5276	14	WSU-USDA Germplasm Collection
ISCI 61	1	5208	15	High Performance Seed
Nemat	4	4768	16	High Performance Seed
Martigena	2	4668	17	Spectrum Crop Development

\* Statistical grouping. Yields of varieties in the same group are not statistically different (LSD, 0.10).

Variety	Fresh weight, tons/ac	Grouping*
Defender	43.6	1
ISCI 99	37.6	2
Pacific Gold	34.9	3
Cover	34.8	3
2003-84	33.9	3
ISCI 61	33.5	3
ISCI 20	33.2	3
Caliente 119	33.0	4
PI 458934	32.4	4
Absolut	32.2	5
Ames 19270	30.3	6
Luna	30.0	6
2003-615	29.2	7
Absolvent	27.3	8
Ida Gold	26.0	9
Martigena	25.6	9
Nemat	21.1	10

\* Statistical grouping. Yields of varieties in the same group are not statistically different (LSD, 0.10).

Results:

***Brassica juncea (except where noted)***

Dry Biomass,			
Variety	lb/ac	Grouping*	Submitted by
ISCI 20	10917	■	High Performance Seed
ISCI 99	10489		High Performance Seed
Caliente 119	9056	■	High Performance Seed- Mustard Blend
Pacific Gold	7004		McKay Seed Inc./Genesee Union Warehouse
PI 458934	5738	■	WSU-USDA Germplasm Collection
Cross N1	5267		High Performance Seed-Brassica cross
ISCI 61	4686		High Performance Seed

\* Statistical grouping. Yields of varieties in the same group are not statistically different (LSD, 0.10).

***Sinapis alba***

Dry Biomass,			
Variety	lb/ac	Grouping*	Submitted by
N3alba	9117	■	High Performance Seed
Martigena	8894		Spectrum Crop Development
N2alba	8290		High Performance Seed
N1alba	8177		High Performance Seed
Ida Gold	7971		McKay Seed Inc./Genesee Union Warehouse
Ames 19270	7640		WSU-USDA Germplasm Collection
N4alba	6931		High Performance Seed
Absolut	5167		High Performance Seed

\* Statistical grouping. Yields of varieties in the same group are not statistically different (LSD, 0.10).

Results:

**2005 Green Manure Variety Trial Results**

*Early trial*

Variety	Dry Biomass, lb/ac	Submitted by
Proso millet	6081*	High Performance Seed
Buckwheat-Manisoba	5903	McKay Seed Inc.

\* Not replicated

*Late trial*

Variety	Dry Biomass, lb/ac*	Submitted by
Caliente 199, mustard blend	6849	High Performance Seed
Sunrise, spring canola	6591	UI
Athena, winter canola	6304	UI
Typhon, turnip x rape	5325	WSU
Nemat, <i>Eruca sativa</i>	5208	High Performance Seed

\* Yields not statistically different

10 other varieties of mustard were planted in the late trial, but they lodged in a rain storm and could not be harvested for biomass.

Results:

**2005 Green Manure Variety Trial Results, % Brix levels**

**Early trial**

Variety	% Brix*	Submitted by
Proso millet	6.8	High Performance Seed
ISCI 2601	6.4	ISCI
ISCI 1203	6.2	ISCI
Sweet sorghum, Topper 76-6	6.0	WSU
Sweet corn-Country Gentleman	5.5	WSU
ISCI 61	4.8	High Performance Seed
Buckwheat-Manisoba	3.1	McKay Seed Inc.

\* p>0.05

**Late trial**

Variety	% Brix*	Submitted by
Martigena	6.1	Spectrum Crop Development
Athena	6.0	UI
ISCI 61	5.8	High Performance Seed
Bastard cabbage	5.7	High Performance Seed
Spectrum 1	5.7	Spectrum Crop Development
Nemat	5.4	High Performance Seed
ISCI 99	5.4	High Performance Seed
Absolut	5.3	High Performance Seed
N1 Raphanus	4.8	High Performance Seed
Sunrise	4.8	UI
Typhon	4.3	WSU

\* p>0.05

Details: Measured with a handheld, temperature compensating, refractometer, on juice expressed from whole plants processed in a commercial juicer.



Results:

**2006 Green Manure Variety Trial Results**

**Early trial**

Variety	Dry Biomass,		Submitted by
	lb/ac*	Grouping*	
Sudangrass, ISCI 2601	13129	■	WSU - ISCI, Bologna, Italy
Sudangrass, Piper	10881	■	WSU
Teff, var. Dessie	6680	■	WSU

\* Statistical grouping. Yields of varieties in the same group are not statistically different (LSD, 0.05).

**Late trial**

Variety	Dry Biomass,		Submitted by
	lb/ac*	Grouping*	
Gamut, mustard blend	8332		Spectrum Crop Development, Ritzville, WA
Pacific Gold, B. juncea	8233		McKay Seed Inc./Genesee Union Warehouse
Accent, S. alba	8085		Signal Seed, Aberdeen, ID
50PG/50IG, mustard blend	7810		McKay Seed Inc./Genesee Union Warehouse
Martigena, S. alba	7319		Spectrum Crop Development
MB16b, Mustard blend	7267		Signal Seed, Aberdeen, ID
Energy, B. juncea	7147		Signal Seed, Aberdeen, ID
Caliente 199, mustard blend	7099		High Performance Seed, Moses Lake, WA
Caliente 119, mustard blend	7077		High Performance Seed, Moses Lake, WA
75PG/25IG, mustard blend	7024		Signal Seed, Aberdeen, ID
Caliente 61, mustard blend	6884		High Performance Seed, Moses Lake, WA
Ida Gold, S. alba	6509		McKay Seed Inc./Genesee Union Warehouse
R34, oilseed radish	6326		Signal Seed, Aberdeen, ID
MB23a, mustard blend	5987		Signal Seed, Aberdeen, ID
RB14, radish/mustard blend	5915		Signal Seed, Aberdeen, ID

\* Yields not statistically different (0.05)

**Mustard Green Manures  
 On-farm Research Results  
 Measurement: Biomass**

Results:

Variety	Species	Mustard Green Manure Trials, 2000-2003						2005	2006
		2000	2001	2002	Biomass Yield <sup>1</sup> , lb DM per acre				
					2003	2004			
Caliente 119	Mustard Blend		10062 ab	7443 abc	6714 c	9056 ab		7077 ns	
Caliente 199	Mustard Blend							7099 ns	
Caliente 61	Mustard Blend							6884 ns	
Gamut	Mustard Blend							8332 ns	
Radish/Caliente	Mustard Blend			7988 ab			See yearly results.		
Cutlass	Oriental Mustard		10540 a				Few plots harvested due to lodging		
ISCI 20	Oriental Mustard		8557 bcd	6631 bc	9487 a	10917 a			
ISCI 61	Oriental Mustard			9232 a	5208 de	4686 c			
ISCI 99	Oriental Mustard				6570 c	10489 a			
Pacific Gold	Oriental Mustard	5022 ab	10704 a	6419 bc	6781 c	7004 abc		8233 ns	
PI 458934	Oriental Mustard				5276 de	5738 bc			
Tilney	White Mustard	5843 a	9331 abc						
Absolut	White Mustard		9627 abc	7621 abc	6185 cd	5167 ns			
Ida Gold	White Mustard	4177 b	6685 e	6047 c	6541 c	7971 ns		6509 ns	
Martigena	White Mustard	4773 b	8433 bcde	8535 a	4668 e	8894 ns		7319 ns	
Ames 19270	White Mustard				6902 c	7640 ns			

<sup>1</sup> Means separation by PLSD at 0.10, ns=differences not significant

For other varieties that were tested, but are not commercially available, and for early season variety trial results, see individual year results

Results:

2010 Green Manure Variety Trial Results					
Variety	Dry Biomass, lb/ac	Grouping*			Source and Species
<i>Mustard entries</i>					
AMPAC	7681				AMPAC, <i>Sinapis alba</i>
Pacific Gold	7015				McKay Seed, <i>Brassica juncea</i>
Martigena	6784				Spectrum Crop Development, <i>Sinapis alba</i>
Ida Gold	5812				McKay Seed, <i>Sinapis alba</i>
Caliente 105	5651				High Performance Seed, mustard blend
Caliente 119	5459				High Performance Seed, mustard blend
Caliente 199	5345				High Performance Seed, mustard blend
IdaPac	5143				McKay Seed, mustard blend
Caliente 61	4812				High Performance Seed, mustard blend
RedOne	4772				ISCI, <i>Brassica juncea</i>
CIN 83	4502				ISCI, <i>Brassica juncea</i>
Nemat/Caliente 199	4232				High Performance Seed, <i>Eruca sativa</i> /mustard blend
<i>Non-mustard entries</i>					
Ground Hog	3311				AMPAC, <i>Raphanus sativus</i>
Nemat	5018				High Performance Seed, <i>Eruca sativa</i>
Pacer	4082				AMPAC, <i>Brassica rapa var. rapa</i>
* Yields not statistically different (0.05)					