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# FIELD SYMPTOM-RESPONSE OF SORGHUM HYBRIDS INFECTED BY MAIZE DWARF MOSAIC VIRUS, SUGARCANE MOSAIC VIRUS STRAIN MDMV-B, AND JOHNSONGRASS MOSAIC VIRUS

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The complex of viruses causing the disease of sorghum (Sorghum bicolor (L.) Moench) called maize dwarf mosaic includes maize dwarf mosaic virus (MDMV), sugarcane mosaic virus strain MDMV-B (SCMV-MDMV-B), johnsongrass mosaic virus (JGMV), and sorghum mosaic virus. At present, MDMV, SCMV-MDMV-B, and JGMV have been isolated from sorghum in Kansas. Infection of sorghum by each virus initially results in a mosaic leaf symptom. However, depending upon genotype, when the temperature drops below approximately 21°C (69°F), the mosaic symptoms of the leaf may become necrotic and kill a portion or all of the leaf (red-leaf reaction). Hybrids expressing the red-leaf symptom show greater reduction in yield. Therefore, inoculation of sorghum hybrids with these viruses will identify those having only the mosaic reaction and, thus, less yield loss and also may indicate which viruses are causing the symptoms.

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### **Procedures**

Studies were conducted at the Kansas State University Agricultural Research Center-Hays to determine symptom response of sorghum hybrids infected by MDMV, SCMV-MDMV-B, and JGMV under 2 years of field testing. Sorghum seed was planted in 6.1 m rows. When at the two-leaf to threeleaf stage, plants in half of each row were inoculated, and plants in the remaining half of the row served as healthy controls. Plants were inoculated with a Devilbiss EGA-502 spray gun attached to a 3.5 L (1 gal) inoculum reservoir. Compressor line pressure was maintained at 7.0 kg/sq cm (100 lbs/sq in). Symptom notes were recorded at biweekly intervals during the growing season beginning 2 weeks after inoculation. Planting was delayed until late June to assure cool temperatures for induction of red-leaf necrosis.

## **Results**

Field symptoms of hybrids are shown in Table 1. Symptoms of infection are given as M = mosaic reactions with no necrosis; NSp = necrotic spots (least severe necrotic reaction); NSt = necrotic streaks often coalescing to form large, irregularly shaped, necrotic areas on the leaf; RL = entire leaf necrotic (most severe necrotic reaction); and NT = not tested. Data indicate that sorghum hybrids having the M reaction suffer less yield loss than plants developing necrosis (RL types).

Table 1. Disease reaction of field-grown sorghum following mechanical inoculation with maize dwarf mosaic virus (MDMV), sugarcane mosaic virus strain MDMV-B (SCMV-MDMV-B), and johnsongrass mosaic virus (JGMV).

	•			
Brand	Hybrid	MDMV	SCMV- MDMV-B	JGMV
Agripro	AP 2440	M	M	M
Agripro	AP 2660	NSt	RL	M
Agripro	AP 9135	NSt	NT	M
Agripro	AP 9210	NSt	NT	M
Agripro	AP 9670	RL	NSt	M
Agripro	AP 9690	NSt	NSt	M
Agripro	AP 9850	M	NT	M
Asgrow	A 425	M	M	NSt
Asgrow	A 504	NSt	RL	M
Asgrow	A 531	NSt	RL	M
Asgrow	A 571	M	M	M
Asgrow	A 570	M	NSt	M
Asgrow	Seneca	M	M	M
Cargill	575	RL	NSt	M
Cargill	607E	NSt	NSt	M
Cargill	611Y	M	NT	NSt
Cargill	627	NSt	RL	M
Cargill	647	M	M	M
Cargill	730	NSt	NS	M
Cargill	737	NSt	M	M
Cargill	775Y	RL	NSt	M
Cargill	837	NSt	NSt	M
Casterline	SR315E	NSt	NSt	M
Casterline	SR317EW	NT	NT	M
Casterline	SR319E	NSt	NSt	M
Casterline	SR324E	NSt	NSt	M
Century II	GB5543-E	M	M	M
Century II	GB7042E	M	M	M
Century II	GB8041W	RL	M	NSt
Century II	GB9140-E	M	M	M
Ciba	1486	NSt	RL	NP
Ciba	1606	NSt	NS	M
Ciba	55492	NSt	NSt	M
Dekalb	DK-35	RL	NSt	M
Dekalb	DK-44	NSt	NSt	NSt
Dekalb	DK-47	M	M	M
Dekalb	DK-38Y	NSt	NSt	NSt
Dekalb	DK-39	NSt	NSt	NSt
Dekalb	DK-40Y	NSt	NSt	NSt
Dekalb	DK-NSt 1Y	NSt	NSt	NSt
Dekalb	DK-45	NSt	NSt	NSt
Dekalb	DK-48	NSt	NSt	M
Dekalb	DK-51	NSt	NSt	M
Dekalb	DK-54	M	M	M
Dekalb	DK-55	NSP	NT	M
Dekalb	DK-56	M	M	NSt
Dekalb	DK-58	NSt	NSt	NSt
Dekalb	M-61	NSt	RL	M
Delange	DA 117	M	M	M
Delange	DS 12C	RL	NSt	M
Delange	DS 11	NSt	RL	M

Table 1. (cor	itinued)			
Brand	Hybrid	MDMV	SCMV- MDMV-B	JGMV
Delange	DS 51	NSt	NSt	M
Delange	DSA 115C	NSt	NT	M
Deltapine	1482	NSt	NSt	M
Deltapine	1490Y	NSt	NSt	M
Deltapine	1505Y	RL	NSt	M
Deltapine	1506	NSt	RL	M
Fontanelle	4425	NSt	RL	M
Fontanelle	5570	M	M	M
Fontanelle	5588	M	M	M
Fontanelle	EXP6300		NSt	M
Golden Harvest		NSt	RL	M
Golden Harvest	11 007	M	M	M
Golden World	GW 1131	NSt	NSt	M
Golden World	GW 5946	M	M	M
Golden World	5872	NSP	NT	NT
Golden World	5960	NSt	NT	M
GRI	23977	NSt	NSt	M
GRI	47967	NSP	NT	M
GRI	54977	RL	RL	M
GRI	57977	NSt	RL	NSt
Hoegemeyer	6650	NSt	NSt	M
Hoegemeyer	671	NSt	NSt	M
Hoegemeyer	6710	NSt	NSt	M
Hoegemeyer	6874	M	NT	M
Hoegemeyer	6878	NSt	RL	M
Hoegemeyer ICI	688	NSt	RL	M
ICI	5514Y	NSt	RL	M
ICI	5536	NSP	M	M
Kaystar	5631Y KS 502	RL M	NSt	M
Kaystar	KS 502 KS 520C	M	M	M
Kaystar	KS 520C KS 525	RL	M	NSt
Kaystar	KS 523 KS 528	NSt	NSt	M
Kaystar	KS 540Y	NSt	RL NG	M
Keltgen	KG 636	M	NSt	NSt
Keltgen	KG 640Y	NSt	M NG+	M
Keltgen	KG 675	M	NSt M	NSt
Keltgen	KG 698cr	RL	M NSt	M
Keltgen	KG 09861 KG 706	NSt	NT	M M
MSG	G256	NSt	RL	M
MSG	G530	NSt	RL	M
MSG	G580	NSt	NSt	M
Mycogen	3838	NSt	NT	M
Mycogen	444E	M	NT	M
Mycogen	466W	RL	NT	M
Mycogen	Oro Amigo	M	NT	M
Mycogen	T-E Hardy	NSt	NT	M
Mycogen	T-E Rio	M	NT	M
Mycogen	T-E Y75	NSt	M	M
NC+	5B74E	M	M	M
NC+	6B50	NSt	NSt	M
NC+	6B67	NSt	NSt	M
NC+	6R55E	NSt	M	M
NC+	6Y831	NSt	RL	M
NC+	7R37E	NSt	NSt	M
NC+	7R83	NSt	NSt	M
				***

Table 1. (continued)

Brand		•		00.00	
NC+         8B15         NSt         NSt         M           NC+         363         RL         NSt         NSt         NSt           Northrup         King         KS 310         NSt         NSt         M           Northrup         King         KS 585         NSt         RL         M           Northrup         King         KS 555Y         RL         NSt         NSt           Northrup King         KS 560Y         M         NSt         MSt           Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           Northrup King         KS 735         NSt         RL         M           Northrup King         KS 735         NSt         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 714Y         RL         NSt<	Brand	Hybrid	MDMV	SCMV-	IGMV
NC+         363         RL         NSt         NSt           Northrup King         KS 310         NSt         NSt         M           Northrup King         KS 585         NSt         RL         M           Northrup King         KS 555Y         RL         NSt         NSt           Northrup King         KS 560Y         M         NSt         M           Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           <					
Northrup King         KS 310         NSt         NSt         M           Northrup King         KS 585         NSt         RL         M           Northrup King         KS 585         NSt         NS         M           Northrup King         KS 555Y         RL         NSt         NSt           Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           Northrup King         KS 735         NSt         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 714Y         RL         NSt         NSt         NSt           Northrup King         KS 714Y         RL         NSt					
Northrup         King         KS 585         NSt         RL         M           Northrup         King         KS 711Y         NSt         NS         M           Northrup         King         KS 555Y         RL         NSt         NSt           Northrup         King         KS 710         RL         RL         M           Northrup         King         KS 714Y         RL         NSt         NSt           Northrup         King         KS 735         NSt         RL         M           Northrup         King         KS 735         NSt         RL         M           Northrup         King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         RL         M           Ohlde         214         RL         NSt         M         M         M           Ohlde         2215         RL         RL         M					
Northrup King         KS 711Y         NSt         NS         M           Northrup King         KS 555Y         RL         NSt         NSt           Northrup King         KS 560Y         M         NSt         M           Northrup King         KS 710         RL         RL         M           Northrup King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         M           Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Ohlde         350         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         NSt			NSt	NSt	M
Northrup King         KS 555Y         RL         NSt         NSt           Northrup King         KS 560Y         M         NSt         M           Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         M           Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         NSt <tr< td=""><td></td><td></td><td></td><td></td><td></td></tr<>					
Northrup King         KS 560Y         M         NSt         M           Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Ohlde         350         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         NSt           Patriot         8638Y         M         M         M         M					
Northrup King         KS 710         RL         RL         M           Northrup King         KS 714Y         RL         NSt         NSt           Northrup King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         M           Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         ML         M           Patriot         8638Y         NSt         NSt         NSt         NSt<				NSt	NSt
Northrup King KS 714Y RL NSt NSt Northrup King KS 735 NSt RL M Ohlde 134 NSt NSt M Ohlde 136 NSt RL M Ohlde 214 RL NSt M Ohlde 215 RL RL M Ohlde 222C M RL M Ohlde 240W NSt RL M Ohlde 246Y NSt RL M Ohlde 350 NSt RL M Ohlde 350 NSt RL M Patriot 8530Y RL NSt M Patriot 8530Y RL NSt M Patriot 8638Y NSt NSt NSt NSt Patriot 8638Y M M M M M Pioneer 8118 NSt RL NSt M Pioneer 8212Y RL NSt M Pioneer 8310 NSt NSt NSt M Pioneer 8414 NSP M M M Pioneer 8500 RL NSt M Pioneer 8500 RL NSt M Pioneer 8500 RL NSt M Pioneer 8522Y M NSt NSt M Pioneer 8500 RL NSt M Pioneer 8522Y M NST				NSt	M
Northrup King         KS 735         NSt         RL         M           Ohlde         134         NSt         NSt         M           Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         246Y         NSt         RL         M           Patriot         8580         NSt         RL         NSt         NSt           Patriot         8638Y         M         M         M         M         M					M
Ohlde         134         NSt         NSt         M           Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         230         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Patriot         8580         NSt         RL         NSt         NSt           Patriot         8638Y         M         M         M         M         M         M<	Northrup King		RL	NSt	NSt
Ohlde         136         NSt         RL         M           Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530         NSt         RL         MSt         M           Patriot         8638Y         NSt         MSt         NSt         MSt			NSt		M
Ohlde         214         RL         NSt         M           Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         246W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M         M           Patriot         8638Y         NSt         NSt         NSt         NSt         NSt           Patriot         8638Y         M			NSt	NSt	M
Ohlde         215         RL         RL         M           Ohlde         222C         M         RL         M           Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8638Y         NSt         NSt         NSt         NSt           Patriot         8638Y         M         M         M         M         M         Pioneer         8118         NSt         M	Ohlde	136	NSt	RL	M
Ohlde         222C         M         RL         M           Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8608Y         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M         M           Pioneer         8118         NSt         RL         NSt         NSt         NSt           Pioneer         8212Y         RL         NSt         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M	Ohlde		RL	NSt	M
Ohlde         240W         NSt         RL         M           Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         NSt           Pioneer         8699         M         M         M           Pioneer         8699         M         M         M           Pioneer	Ohlde		RL	RL	M
Ohlde         246Y         NSt         RL         M           Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M         M           Pioneer         8500         RL         NSt         M         M         NSt         NSt         MSt         NSt         MSt         NSt         NSt         NSt         NSt         MSt         NSt         NSt <td>Ohlde</td> <td>222C</td> <td>M</td> <td>RL</td> <td>M</td>	Ohlde	222C	M	RL	M
Ohlde         350         NSt         RL         M           Patriot         8530Y         RL         NSt         M           Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M           Pioneer         8771         M         M         M           Triumph         TR 459         M         M         M           Triumph         TR 481         M         M         M           Triumph </td <td>Ohlde</td> <td></td> <td>NSt</td> <td>RL</td> <td>M</td>	Ohlde		NSt	RL	M
Patriot         8530Y         RL         NSt         M           Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 481         M         M         M         M           Triumph         TR 65-G         M	Ohlde	246Y	NSt	RL	M
Patriot         8580         NSt         RL         M           Patriot         8608Y         NSt         NSt         NSt           Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         MSt           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M           Pioneer         8771         M         M         M           Triumph         TR 459         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M <td< td=""><td>Ohlde</td><td></td><td>NSt</td><td>RL</td><td>M</td></td<>	Ohlde		NSt	RL	M
Patriot         8608 Y         NSt         NSt         NSt           Patriot         8638 Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212 Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         MSt           Pioneer         8699         M         M         M           Pioneer         8771         M         M         M           Triumph         TR 459         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt <t< td=""><td>Patriot</td><td>8530Y</td><td>RL</td><td>NSt</td><td>M</td></t<>	Patriot	8530Y	RL	NSt	M
Patriot         8638Y         M         M         M           Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y	Patriot	8580	NSt	RL	M
Pioneer         8118         NSt         RL         NSt           Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         MSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M         M           Triumph         TR 82-G         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M         M	Patriot	8608Y	NSt	NSt	NSt
Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M <td< td=""><td></td><td></td><td></td><td></td><td>M</td></td<>					M
Pioneer         8212Y         RL         NSt         M           Pioneer         8282         NSt         NSt         M           Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M <td< td=""><td>Pioneer</td><td></td><td>NSt</td><td>RL</td><td>NSt</td></td<>	Pioneer		NSt	RL	NSt
Pioneer         8310         NSt         NSt         M           Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M         M	Pioneer			NSt	M
Pioneer         8414         NSP         M         M           Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt         NSt           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M         M	Pioneer	8282	NSt	NSt	M
Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt         NSt           Triumph         TR 481         M		8310	NSt	NSt	M
Pioneer         8500         RL         NSt         M           Pioneer         8505         M         NSt         M           Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M         M         M         M           Triumph         TR 474         NSt         NSt         NSt         NSt           Triumph         TR 481         M         M         M         M           Triumph         TR 65-G         M         M         M         M           Triumph         TR 82-G         M         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M	Pioneer	8414	NSP	M	M
Pioneer         8522Y         M         NSt         NSt           Pioneer         8699         M         M         M         M           Pioneer         8771         M         M         M         M           Triumph         TR 459         M <td></td> <td>8500</td> <td></td> <td>NSt</td> <td>M</td>		8500		NSt	M
Pioneer         8699         M         M         M           Pioneer         8771         M         M         M           Triumph         TR 459         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 481         M         M         M           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M		8505	M	NSt	M
Pioneer         8771         M         M         M           Triumph         TR 459         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 481         M         M         M           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M		8522Y	M	NSt	NSt
Triumph         TR 459         M         M         M           Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 481         M         M         M           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M	Pioneer	8699	M	M	M
Triumph         TR 474         NSt         NSt         NSt           Triumph         TR 481         M         M         M           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M			M	M	M
Triumph         TR 481         M         M         M           Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M	Triumph	TR 459		M	M
Triumph         TR 65-G         M         M         M           Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M		TR 474	NSt	NSt	NSt
Triumph         TR 82-G         M         M         M           Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M			M	M	M
Wilson         515w         RL         NSt         NSt           Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M	Triumph	TR 65-G	M	M	M
Wilson         535Y         NSt         RL         M           Wilson         568E         M         M         M		TR 82-G	M	M	M
Wilson 568E M M M	Wilson		RL	NSt	NSt
Wilson 568E M M M	Wilson	535Y	NSt	RL	M
Wilson E9190W M M M			M	M	M
	Wilson	E9190W	M	M	M