



## Supplementary Material

# Pollination Deficit in Apple Orchards at Murree, Pakistan

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**Supplementary Table I.- Correlation matrix of the dependent and independent variables in the unmanaged orchards (2013 experiment).**

	<i>Apis mellifera</i>	<i>Apis cerana</i>	<i>Apis dorsata</i>	<i>Apis florea</i>	<i>Bombus</i> sp.	<i>Xylocopa</i> sp.	Non Apis bees	Syrphids	Butterfly	No. of fruits per tree	Avg. fruit weight (g)	Avg No. of seeds per fruit	Yield per tree (kg)
<i>Apis mellifera</i>													
<i>Apis cerana</i>	0.263 0.463												
<i>Apis dorsata</i>	0.033 0.927	0.135 0.710											
<i>Apis florea</i>	0.650 0.042	0.157 0.665	0.198 0.583										
<i>Bombus</i> sp.	0.219 0.544	-0.056 0.877	0.505 0.137	0.774 0.009									
<i>Xylocopa</i> sp.	0.658 0.039	0.441 0.202	0.365 0.300	0.713 0.021	0.620 0.056								
Non Apis bees	0.665 0.036	0.509 0.133	0.206 0.567	0.674 0.033	0.615 0.059	0.839 0.002							
Syrphids	0.209 0.563	0.334 0.346	0.401 0.251	0.043 0.906	0.262 0.465	0.013 0.972	0.062 0.865						
Butterfly	0.408 0.241	0.652 0.041	-0.505 0.137	0.127 0.726	0.408 0.242	0.215 0.550	0.142 0.696	0.383 0.274					
No. of fruits per tree	-0.070 0.847	0.136 0.707	0.246 0.493	-0.131 0.717	0.075 0.837	0.217 0.547	0.172 0.634	0.139 0.701	0.015 0.967				
Avg. fruit weight (g)	0.374 0.287	0.078 0.831	0.829 0.003	-0.231 0.520	0.120 0.741	0.094 0.796	0.126 0.728	0.568 0.087	0.349 0.323	0.310 0.384			
Avg No. of seeds per fruit	0.129 0.723	-0.036 0.921	0.596 0.069	0.149 0.682	0.563 0.091	-0.259 0.470	0.155 0.668	0.472 0.168	0.499 0.142	0.274 0.443	0.522 0.122		
Yield per tree (kg)	0.012 0.974	0.217 0.546	0.289 0.419	0.153 0.674	0.093 0.799	0.303 0.394	0.156 0.666	0.177 0.624	0.027 0.940	0.955 0.000	0.381 0.278	0.109 0.764	

**Supplementary Table II.- Correlation matrix of the dependent and independent variables in the managed orchards (2013 experiment).**

	<i>Apis mellifera</i>	<i>Apis cerana</i>	<i>Apis dorsata</i>	<i>Apis florea</i>	<i>Bombus</i> sp.	<i>Xylocopa</i> sp.	Non Apis bees	Syrphids	Butterfly	No. of fruits per tree	Avg. fruit weight (g)	Avg No. of seeds per fruit (kg)	Yield per tree (kg)
<i>Apis mellifera</i>													
<i>Apis cerana</i>	0.467 0.174												
<i>Apis dorsata</i>	0.006 0.986	-0.292 0.413											
<i>Apis florea</i>	0.014 0.970	0.087 0.811	0.202 0.575										
<i>Bombus</i> sp.	0.530 0.115	0.420 0.227	0.366 0.298	0.27 30.446									
<i>Xylocopa</i> sp.	0.208 0.564	0.011 0.977	0.443 0.199	0.390 0.265	0.279 0.436								
Non Apis bees	0.620 0.056	0.215 0.550	0.223 0.536	-0.479 0.162	0.479 0.161	0.045 0.902							
Syrphids	0.122 0.736	-0.351 0.320	0.436 0.208	0.597 0.069	0.079 0.828	0.535 0.111	-0.291 0.415						
Butterfly	-0.119 0.743	0.272 0.448	-0.506 0.136	0.028 0.939	-0.320 0.368	0.424 0.222	-0.399 0.254	-0.029 0.937					
No. of fruits per tree	0.069 0.849	0.585 0.076	-0.270 0.450	-0.133 0.715	0.366 0.298	-0.481 0.159	0.122 0.737	-0.502 0.140	-0.130 0.721				
Avg. fruit weight (g)	0.526 0.118	0.176 0.627	0.140 0.699	0.512 0.131	0.714 0.020	0.104 0.776	0.082 0.823	0.289 0.418	-0.307 0.388	0.332 0.348			
Avg. No. of seeds per fruit	-0.327 0.356	-0.744 0.014	0.060 0.868	-0.510 0.132	-0.275 0.441	-0.148 0.683	-0.001 0.998	-0.120 0.741	-0.120 0.740	-0.409 0.240	-0.237 0.510		
Yield per tree (kg)	0.408 0.242	0.637 0.048	-0.334 0.345	0.270 0.451	0.553 0.097	-0.210 0.561	0.095 0.794	-0.232 0.519	-0.041 0.911	0.807 0.005	0.719 0.019	-0.556 0.095	

**Supplementary Table III.- Correlation Matrix of the dependent and independent variables in the unmanaged Orchards (2014 experiment).**

	<i>Apis mellifera</i>	<i>Apis cerana</i>	<i>Apis dorsata</i>	<i>Apis florea</i>	<i>Bombus sp.</i>	<i>Xylocopa sp.</i>	Non Apis bees	Syrphids	Butterfly	No. of fruits per tree	Avg. fruit weight (g)	Avg. No. of seeds per fruit (kg)	Yield per tree (kg)
<i>Apis mellifera</i>													
<i>Apis cerana</i>	0.294 0.409												
<i>Apis dorsata</i>	0.682 0.030	0.649 0.042											
<i>Apis florea</i>	-0.291 0.415	0.134 0.713	0.092 0.801										
<i>Bombus sp.</i>	0.818 0.004	-0.099 0.786	0.472 0.168	-0.192 0.595									
<i>Xylocopa sp.</i>	0.350 0.321	-0.227 0.529	-0.154 0.671	-0.733 0.016	0.090 0.805								
Non Apis bees	0.338 0.339	-0.046 0.901	0.324 0.361	-0.365 0.300	0.216 0.550	0.572 0.084							
Syrphids	-0.410 0.239	-0.554 0.097	-0.744 0.014	0.100 0.784	-0.185 0.610	0.039 0.915	-0.493 0.147						
Butterfly	0.698 0.025	-0.035 0.924	0.497 0.144	-0.059 0.872	0.563 0.090	0.302 0.396	0.448 0.194	-0.292 0.413					
No. of fruits per tree	0.113 0.756	0.405 0.245	0.315 0.375	-0.310 0.383	-0.141 0.698	0.213 0.554	0.577 0.081	-0.722 0.018	0.140 0.699				
Avg. fruit weight (g)	-0.453 0.189	0.256 0.475	-0.345 0.329	0.170 0.639	-0.562 0.091	-0.078 0.830	-0.181 0.616	0.275 0.441	-0.497 0.144	-0.187 0.606			
Avg. No. of seeds per fruit	-0.365 0.299	0.079 0.829	0.122 0.737	0.279 0.435	-0.262 0.465	-0.357 0.312	-0.102 0.780	0.052 0.886	-0.463 0.177	-0.392 0.262	0.364 0.301		
Yield per tree (kg)	0.300 0.399	0.677 0.031	0.417 0.230	-0.206 0.568	0.049 0.894	0.078 0.830	0.397 0.257	-0.697 0.025	-0.022 0.952	0.818 0.004	0.066 0.856	-0.319 0.370	

**Supplementary Table IV.- Correlation matrix of the dependent and independent variables in the managed orchards (2014 experiment).**

	<i>Apis mellifera</i>	<i>Apis cerana</i>	<i>Apis dorsata</i>	<i>Apis florea</i>	<i>Bombus</i> sp.	<i>Xylocopa</i> sp.	Non Apis bees	Syrphids	Butterfly	No. of fruits per tree	Avg. fruit weight (g)	Avg. No. of seeds per fruit	Yield per tree (kg)
<i>Apis mellifera</i>													
<i>Apis cerana</i>	0.544												
	0.104												
<i>Apis dorsata</i>	0.020	-0.238											
	0.956	0.509											
<i>Apis florea</i>	-0.141	0.278	0.579										
	0.698	0.437	0.079										
<i>Bombus</i> sp.	0.408	0.270	-0.643	-0.485									
	0.242	0.450	0.045	0.155									
<i>Xylocopa</i> sp.	0.632	0.391	-0.026	0.032	0.657								
	0.050	0.264	0.942	0.929	0.039								
Non Apis bees	0.015	-0.252	0.163	-0.145	-0.064	0.044							
	0.967	0.483	0.653	0.690	0.861	0.903							
Syrphids	-0.174	-0.118	0.143	0.436	0.044	0.172	-0.520						
	0.631	0.745	0.694	0.208	0.904	0.635	0.124						
Butterfly	0.169	0.013	0.606	0.508	-0.665	-0.062	-0.147	0.062					
	0.641	0.971	0.063	0.134	0.036	0.865	0.686	0.865					
No. of fruits per tree	0.647	0.079	0.223	-0.355	0.099	0.198	0.327	-0.241	-0.083				
	0.043	0.829	0.536	0.314	0.786	0.583	0.356	0.502	0.819				
Avg. fruit weight (g)	0.557	0.364	-0.241	-0.068	0.435	0.486	-0.023	0.376	-0.190	0.509			
	0.095	0.301	0.502	0.853	0.209	0.155	0.949	0.285	0.599	0.133			
Avg. No. of seeds per fruit	0.289	-0.110	0.306	0.171	0.171	0.204	0.221	-0.054	0.063	0.038	-0.143		
	0.418	0.763	0.391	0.636	0.637	0.572	0.539	0.881	0.864	0.917	0.693		
Yield per tree (kg)	0.773	0.140	0.004	-0.392	0.273	0.384	0.112	-0.055	0.027	0.861	0.738	0.003	
	0.009	0.700	0.991	0.263	0.446	0.273	0.759	0.880	0.941	0.001	0.015	0.994	