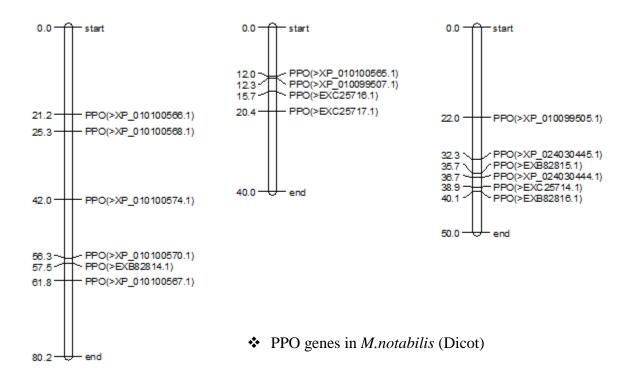
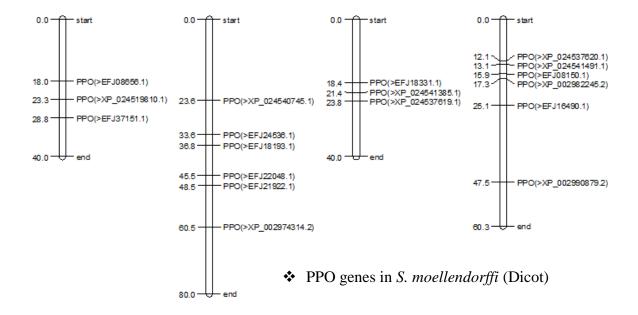
Supplementary Information: Figure A - Figure 7(b)

Supplementary file: Insilco Physical Mapping of PPOs and POX Genes, the total number of PPO genes are represented on etch chromosomal location. On the other hand, the results POX genes are presented via directly extracting form CoGe blast, that show the distribution of cluster of genes on individual chromosomes number

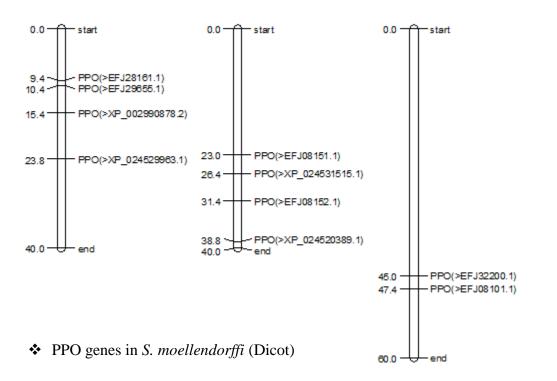
Morus.notabilis(Un-Scaffold) Morus.notabilis(Un-Scaffold) Morus.notabilis(Un-Scaffold)



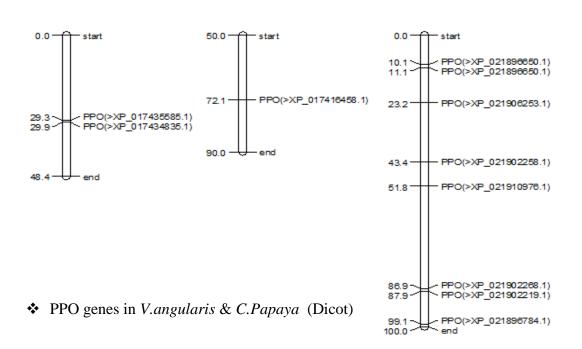
Selaginella(Scaffold.1) Selaginella(Scaffoldl.4) Selaginella(Scaffoldl.7) Selaginella(Scaffoldl.9)



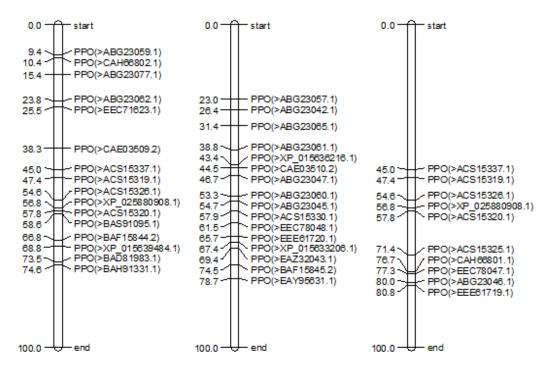
Selaginella(Scaffoldl.16) Selaginella(Scaffoldl.45) Selaginella(Scaffoldl.53)



Vigna.angularis(Chr9) Vigna.angularis(Chr3) Carica.papaya(Un-Scaffold)

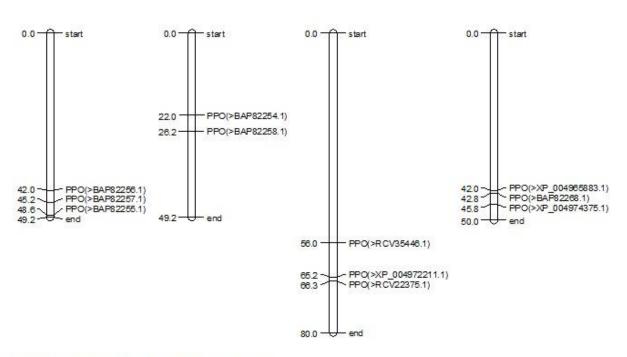


Zea.mays(Chr-3) Zea.mays(Chr-4) Zea.mays(Chr-9) Zea.mays(Chr-10) / start /- PPO(>XP_008683490.1) > PPO(>AQK46299.1) 0.0 start 0.0 start PPO(>NP_001147887.2) PPO(>ACG28948.1) 13.9 PPO(>PWZ48049.1) 17.3 PPO(>PWZ45673.1) PPO(>XP_008674942.1) PPO(>PWZ33588.1) PPO(>PWZ06435.1) 18.8 PPO(>NP_001149552.1) 24.1 26.8 PPO(>PWZ43422.1) ✓ PPO(>NP_001142971.1) ¬ PPO(>ACL53208.1) ¬ PPO(>PWZ28247.1) 40.0 U end 40.0 - PPO(>ONM83010.1) - PPO(>ONM83009.1) - PPO(>XP_008662712.1) U end -PPO(>ONM63006.1) 60.3 60.5 ❖ PPO genes in *Z.mays* (Monocot) 80.0

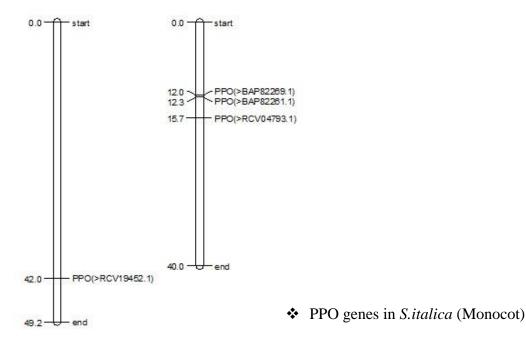


❖ PPO genes in *O.sativa* (Monocot)

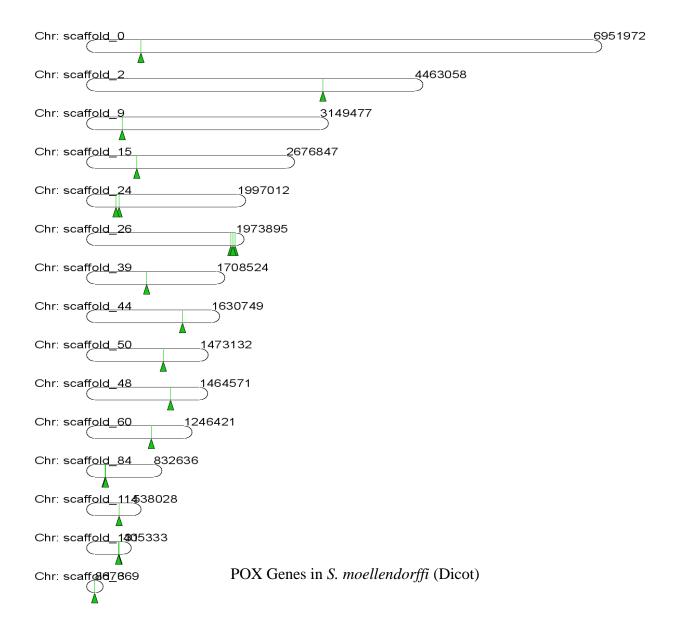
Setaria.italica(chrl) Setaria.italica(chrll) Setaria.italica(chrVII) Setaria.italica(chrVII)

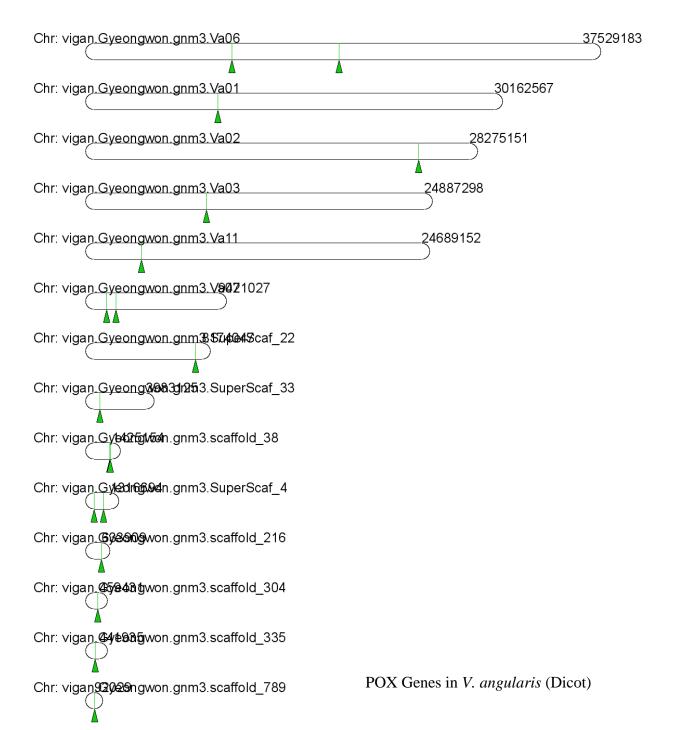


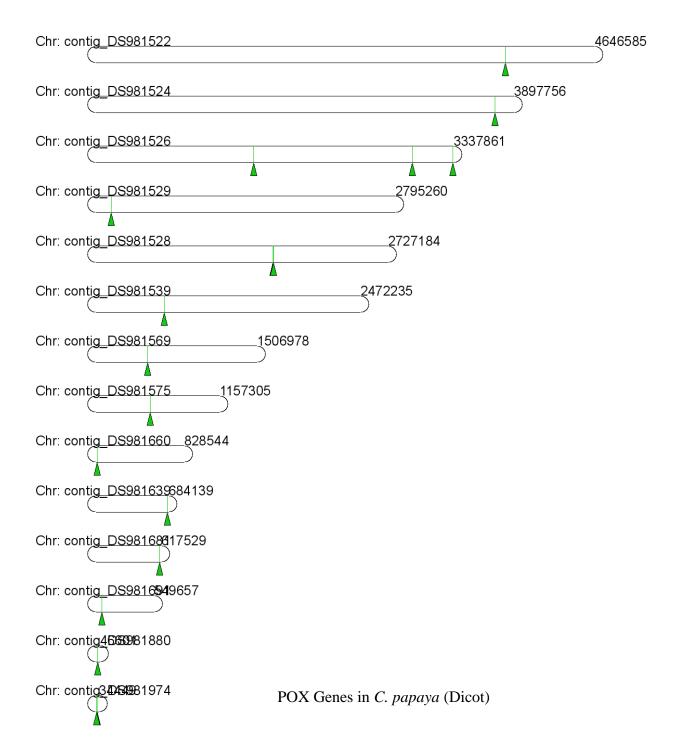
Setaria.italica(chrVIII) Setaria.italica(chrIX)

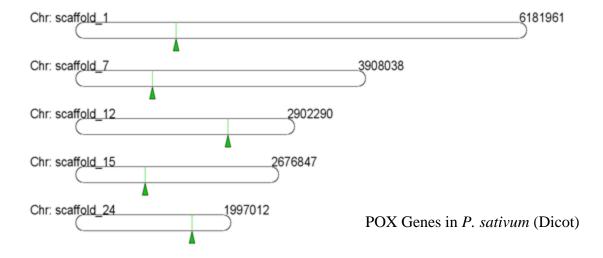


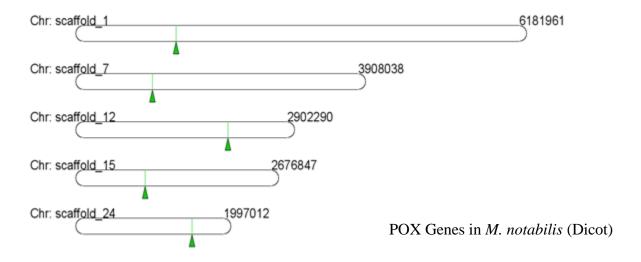
POX gene family

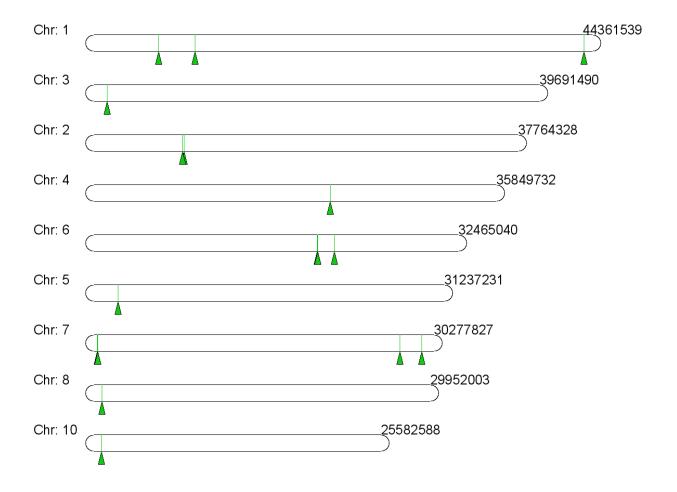




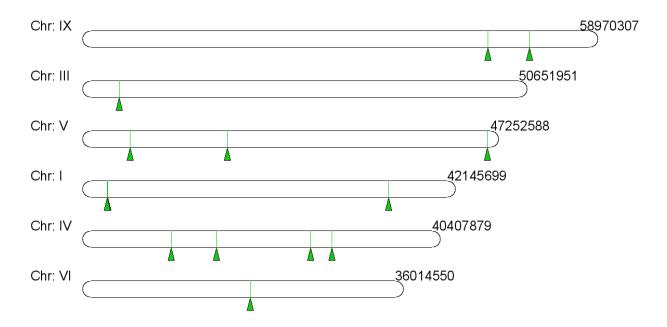




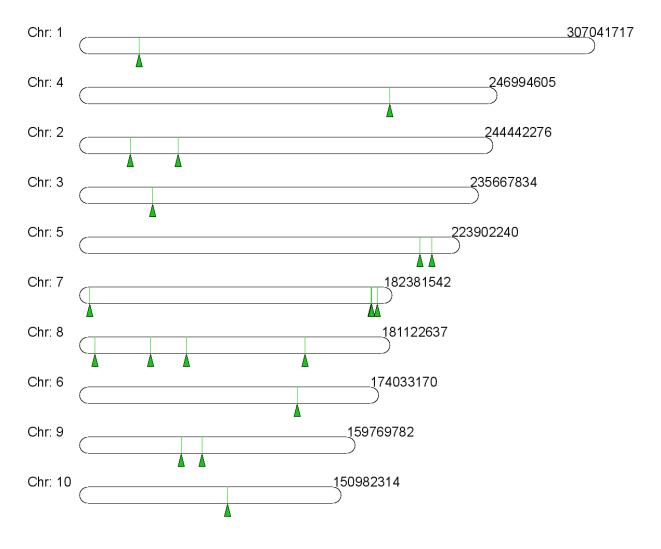




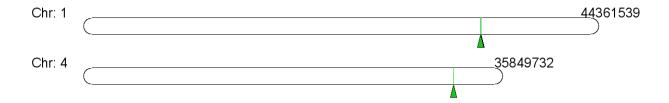
POX Genes in O. sativa (Monocot)



POX Genes in S. italic (Monocot)



POX -A Genes in Z. mays (Monocot)



POX Genes in A. sativa (Monocot)

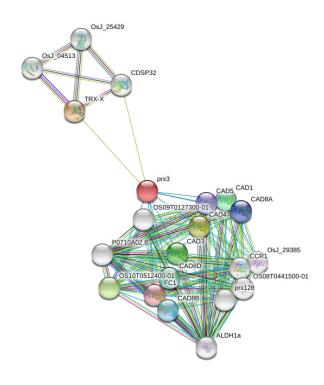


Figure (a): The networks of POX were downloaded from String database

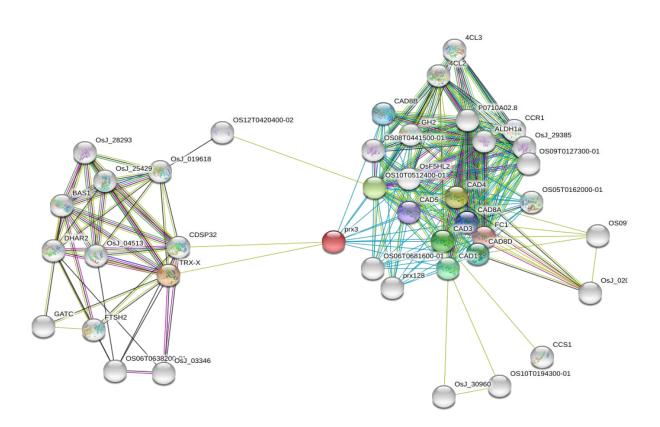


Figure: POX genes network divided into 9 k-means clusters

 TRX-X Thioredoxin X, chloroplastic; Thiol-disulfide oxidoreductase that may participate in various redox reactions. Possess CAD4 Putative cinnamyl alcohol dehydrogenase 4; Involved in lignin biosynthesis. Catalyzes the final step specific for the OS10T0512400-01 Cytochrome P450 84A1, putative, expressed; Os10g0512400 protein (530 aa) CAD3 Probable cinnamyl alcohol dehydrogenase 3; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD1 Probable cinnamyl alcohol dehydrogenase 1; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD8D Probable cinnamyl alcohol dehydrogenase 8D; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8B Probable cinnamyl alcohol dehydrogenase 8B; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8A Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD5 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD5 Probable cinnamyl alcohol dehydrogenase 7; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD5 Cinnamyl alcohol dehydrogenase 7; Involved in lignin biosynthesis. May catalyze the final step specific for the produ 				
 ○ OS10T0512400-01 Cytochrome P450 84A1, putative, expressed; Os10g0512400 protein (530 aa) ○ CAD3 Probable cinnamyl alcohol dehydrogenase 3; Involved in lignin biosynthesis. Catalyzes the final step specific for the ○ CAD1 Probable cinnamyl alcohol dehydrogenase 1; Involved in lignin biosynthesis. Catalyzes the final step specific for the ○ CAD8D Probable cinnamyl alcohol dehydrogenase 8D; Involved in lignin biosynthesis. Catalyzes the final step specific for th ○ CAD8B Probable cinnamyl alcohol dehydrogenase 8B; Involved in lignin biosynthesis. Catalyzes the final step specific for th ○ CAD8A Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th ○ CAD8 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for th ○ CAD5 	TRX-X	$Thio redoxin \ X, chloroplastic; Thiol-disulfide \ oxido reductase \ that \ may \ participate \ in \ various \ redox \ reactions. \ Possess$	•	0.770
 CAD3 Probable cinnamyl alcohol dehydrogenase 3; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD1 Probable cinnamyl alcohol dehydrogenase 1; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD8D Probable cinnamyl alcohol dehydrogenase 8D; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8B Probable cinnamyl alcohol dehydrogenase 8B; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8A Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD5 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD5 	CAD4	Putative cinnamyl alcohol dehydrogenase 4; Involved in lignin biosynthesis. Catalyzes the final step specific for the	•	0.650
 CAD1 Probable cinnamyl alcohol dehydrogenase 1; Involved in lignin biosynthesis. Catalyzes the final step specific for the CAD8D Probable cinnamyl alcohol dehydrogenase 8D; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8B Probable cinnamyl alcohol dehydrogenase 8B; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD8A Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th CAD5 CAD5 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the 0.650 		Cytochrome P450 84A1, putative, expressed; Os10g0512400 protein (530 aa)	•	0.650
	CAD3	Probable cinnamyl alcohol dehydrogenase 3; Involved in lignin biosynthesis. Catalyzes the final step specific for the	•	0.650
	CAD1	Probable cinnamyl alcohol dehydrogenase 1; Involved in lignin biosynthesis. Catalyzes the final step specific for the	•	0.650
● CAD8A Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th • 0.650 ● CAD5 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the • 0.650	CAD8D	Probable cinnamyl alcohol dehydrogenase 8D; Involved in lignin biosynthesis. Catalyzes the final step specific for th	•	0.650
CAD5 Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the 0.650		Probable cinnamyl alcohol dehydrogenase 8B; Involved in lignin biosynthesis. Catalyzes the final step specific for th	•	0.650
	CAD8A	Probable cinnamyl alcohol dehydrogenase 8A; Involved in lignin biosynthesis. Catalyzes the final step specific for th	•	0.650
FC1 Cinnamyl alcohol dehydrogenase 7; Involved in lignin biosynthesis. May catalyze the final step specific for the produ • 0.650	CAD5	Probable cinnamyl alcohol dehydrogenase 5; Involved in lignin biosynthesis. Catalyzes the final step specific for the	•	0.650
	● FC1	Cinnamyl alcohol dehydrogenase 7; Involved in lignin biosynthesis. May catalyze the final step specific for the produ	•	0.650

Figure (c): Predicted functional partner of POX-A genes

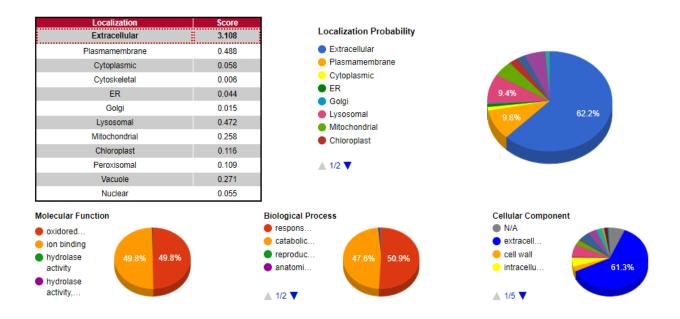


Figure 7(b): A sub- cellular localization and gene ontology (A: Molecular functions, B; Biological functions and C; Cellular functions) of POX genes. A confidence score are predicted in different colour coded.