

S U M M A R Y

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Results obtained from this investigation could be summarized as follows:

1. Rotted soybean seedlings, collected from various localities in A.R.E., yielded three Rhizoctonia solani isolates.

2. The 3 Rhizoctonia solani isolates proved to be pathogenic, and caused pre-, and post-emergence damping-off to soybean plants.

3. R. solani isolates differed in their pathogenicity, isolate II was the more pathogenic isolate, followed by isolate I, whereas isolate III was the weakly^{est} one.

4. R. solani caused severe damping-off (pre-, and post-emergence damping-off) to soybean seedlings. R. solani inhibited the secondary roots development, and caused brown cankers to hypocotyls.

5. The 25 soybean cultivars and lines tested differed greatly in their susceptibility against the three R. solani isolates.

6. Cultivars Gasoy 17 and Davis were more resistant to the three R. solani isolates.

7. Cultivars Improved pelican, and Centennial were more susceptible to the three R. solani isolates.

8. Cutler 71 and Roonake cultivars showed intermediate susceptibility to R. solani infection.

9. Lycine, Histidine, Arginine, Serine, Glycine, Glutamic, Therionine, Alanine, Proline, Tyrosine, Valine, Lucine and Isolucine were found in healthy and diseased soybean seedlings.

10. Cystine was found in the diseased seedlings of the susceptible soybean cultivar only, however Lycine was found in the resistant cultivar.

11. Total amino acids content in healthy seedlings of the susceptible cultivar was higher than that in the resistant one.

12. Total amino acids content increased in the resistant and susceptible cultivars in response to R. solani infection with higher proportion in the susceptible cultivar.

13. The healthy seedlings of the susceptible cultivar contained higher amount of total and reducing sugars than that in the resistant one.

14. Total sugars increased in response to R. solani infection in both susceptible and resistant cultivars, but

sharp increase was detected in the susceptible cultivar than that in the resistant one.

15. Reducing sugars increased in response to R. solani infection in susceptible and resistant cultivars, however the increase was noticeable in the susceptible cultivar than that in the ~~resistant~~ one.

16. The healthy seedlings of the resistant cultivar contained higher amount of phenols than that in the susceptible one.

17. Total phenols increased in response to R. solani infection in both susceptible and resistant cultivars, but great increase was detected in the resistant cultivar than that in the susceptible one.

18. Free phenols increased in response to R. solani infection in both resistant and susceptible cultivars, but noticeable increase was detected in the resistant one than that in the susceptible one.

19. Catalase activity was higher in the resistant cultivar than that in the susceptible one in healthy and diseased seedlings.

20. Catalase activity increased due to R. solani infection in resistant and susceptible cultivars.

21. Peroxidase activity was higher in the resistant cultivar than that in the susceptible one in both healthy and diseased soybean seedlings.

22. Peroxidase activity increased due to R. solani infection in both resistant and susceptible cultivars. Increase was higher in the resistant cultivar than that in the susceptible one.

23. Polyphenol oxidase activity was higher in the resistant cultivar than that in the susceptible one in healthy and diseased soybean seedlings.

24. Polyphenol oxidase activity increased in response to R. solani infection in both resistant and susceptible cultivars, however great increase was noticed in the resistant cultivar than that in the susceptible one.

25. Histopathological studies show that, the tested R. solani isolates differed in their virulence. Isolate II, the more virulent one, caused complete disintegration of epidermis, cortex and endodermis, while isolate III, the less virulent one, caused partial disintegration and compression of the outer layer of the cortex.

26. The virulent and less virulent R. solani isolates invaded the tissues intra-, and intercellularly.

27. Meloidogyne javanica increased percentage of pre-, and post-emergence damping-off, when it was combined with R. solani.

28. Pre-, and post emergence damping-off, in case of combination of R. solani and M. javanica, were higher in Centennial cultivar than that in the other cultivars and lines tested, followed by that in D75-9925, D71-9967, and D72-7139.

29. Survival plants were highly affected when R. solani and M. javanica were combined together, followed by R. solani or M. javanica alone.

30. R. solani decreased the number of root-knot nematode galls when it was combined with M. javanica.

31. Centennial cultivar show the greatest number of galls per plant, followed by D71-9967, D72-7139, and D75-9925 soybean lines.

32. Root-knot nematode population (larvae and females) decreased in all cultivars and lines tested, when M. javanica was combined with R. solani.

33. The highest nematode population stages were recorded in Centennial cultivar, followed by D71-9967, D72-7139 and D75-9925 soybean lines.

34. The lowest fresh weight was obtained when R. solani was combined with M. javanica, followed by R. solani and M. javanica alone in all cultivars and lines tested.

35. Percentage of pre-, and post-emergence damping-off decreased in case of combination of R. solani and Rhizobium japonicum in both tested soybean cultivars, Hutton and D71-9967.

36. Number, size and activity of nodules decreased in case of combination of R. solani and Rh. japonicum compared with Rh. japonicum alone in both tested soybean cultivars.

37. Plant height increased in case of combination of R. solani and Rh. japonicum compared with R. solani alone in both tested soybean cultivars.

38. Plant fresh weight increased in case of combination of R. solani and Rh. japonicum compared with R. solani alone in both tested soybean cultivars.