Quantification of the *Phytophthora infestans* population densities in upland soils in Japan using real-time PCR

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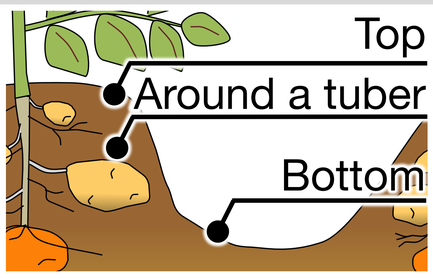
To estimate the *Phytophthora infestans* population density in soil using real-time PCR, we used a modified CTAB-bead-beating method to extract DNA from upland soils in Japan. The quantity data obtained using real-time PCR were compatible with the symptom development in a non-control potato field. Furthermore, there was a correlation between the quantity of *P. infestans* DNA measured by real-time PCR and the inoculum potential in soil. Therefore, the quantification of the population density of *P. infestans* using real-time PCR may be a guide to preventing potato storage rot.

Objectives

Tuber rot can be minimized by decreasing harvesting injuries and/or the population density of *P. infestans* in soil [1]. However, it is impossible to harvest tubers without injury. Thus, we developed the real-time PCR assay to estimate *P. infestans* densities in soils and investigated the relationship between DNA quantity and inoculum potential.

Materials & Methods

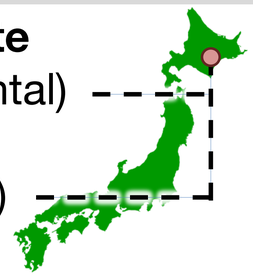
■ Sample soils



Fields & Sampling Date

1. HARC (Experimental) (Jul.-Sep., 2017)

2-4. A-C (Commercial) (Aug. 21, 2018)



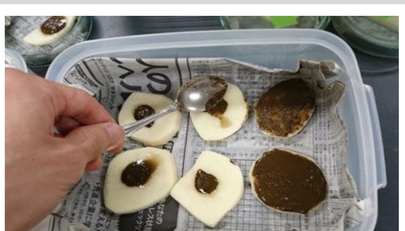
■ Extraction & Real-time PCR

Templates were analyzed using real-time PCR system

System: StepOnePlus (Applied biosystems)

Primers, Probe: PinfTQF/PinfTQR, PinfTQPR [2]

■ Inoculum potential

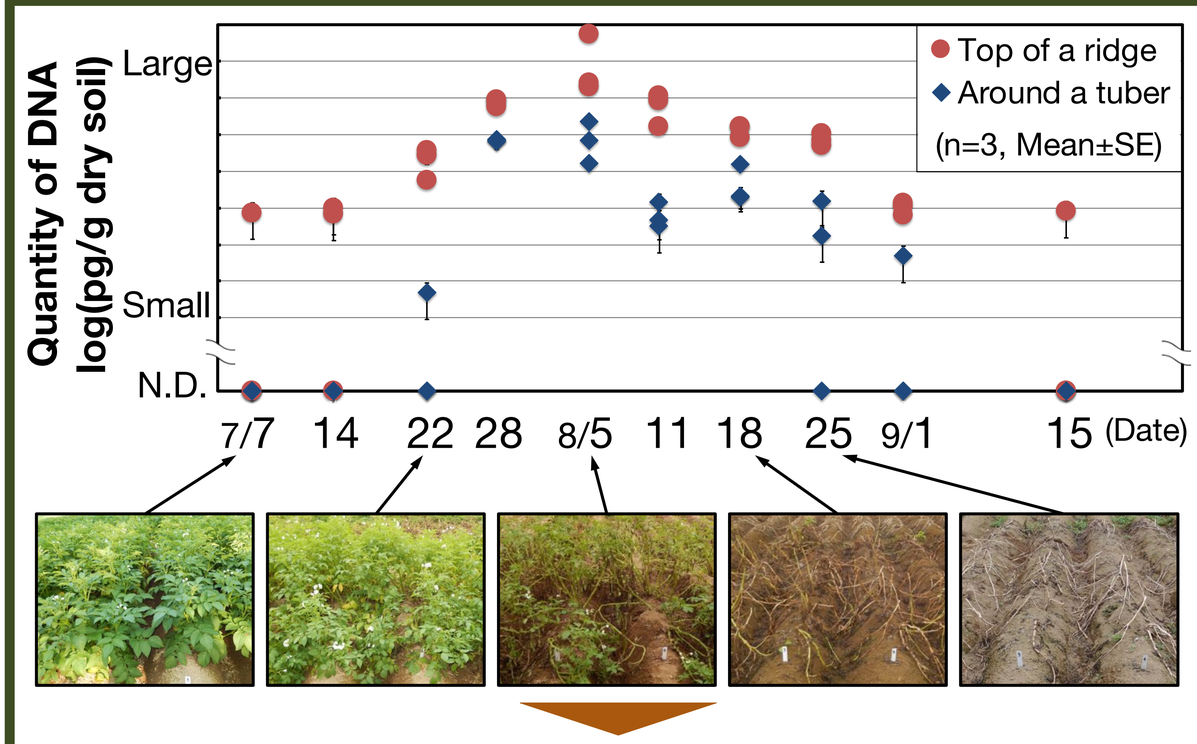


Method:

Sato's test [3]

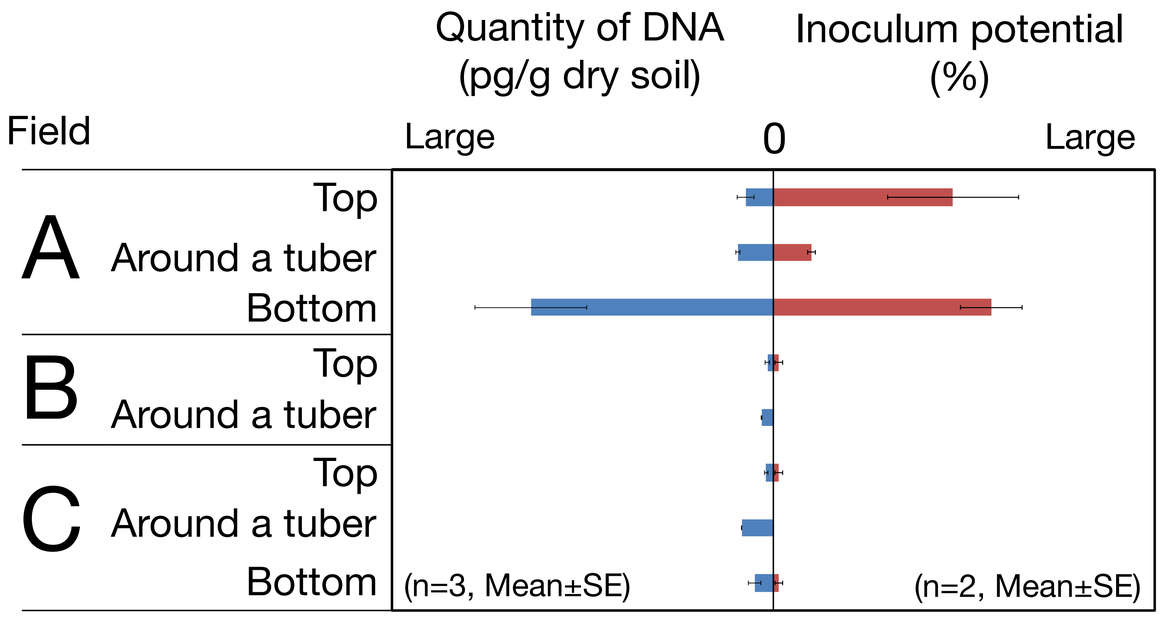
$$\text{Inoculum potential (\%)} = \frac{\text{Rotten tuber pieces}}{\text{Total tuber pieces}} \times 100$$

Result 1



◆The quantity data were compatible with the symptom development.

Result 2



◆There was a positive correlation between the quantity of *P. infestans* DNA and the inoculum potential.

Conclusion & Future work

◆Quantification of the DNA in soil may be a guide to preventing storage rot.

◆Another factor also should be investigated how much it affects tuber rot.

Acknowledgement

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References

[1]Osawa et al. 2018: [2]Lees et al. 2012: [3]Sato 1980: