

Banana blood disease (522)

Summary

- Narrow. Indonesia and Malaysia. Not recorded in Oceania.
- Major bacterial disease of banana - *Musa acuminata*, *Musa bulbisiana*, their hybrids, and *Musa textalis*. ABB and BBB cooking bananas especially susceptible. Information lacking on wild hosts.
- Symptoms vary depending on source of infection:
 - (i) from soil : leaves yellow, wilt, collapse, and die. Internally, reddish-brown vascular staining, and white/yellow/red or black ooze.
 - (ii) from flowers: fruit stem is invaded, flowers blacken, bell rots, fruits have internal rots, but remain green, and vascular tissues darken. Infections reach the corm, then leaf sheaths, and leaves turn brown, wilt and die.
- Spread: infected suckers, in soil, water, root-to-root contact; by insects (visiting male and female flowers); by pruning knives; from discarded infected fruit; mud on machinery/vehicles. Survival in soil for >1year.
- Biosecurity: risk is from unofficial introduction of diseased cuttings for propagation; possibly infected fruit; risk also from mud on vehicles. Official movement of germplasm should always follow the FAO/IPBGR Technical Guidelines.
- Biocontrol: none.
- Cultural control: take cuttings from apparently healthy plants, ideally from government scheme (if exist); avoid planting near diseased bananas; limit visitors/animals/workers to plantations; weed; remove male 'bell' after last hand emerges; bag flowers; clean tools frequently after use (bleach); remove diseased plants immediately, and contain spread with trench, leaving area fallow for 18 months or grow legume cover crop; clean soil from machinery/vehicles. Use local knowledge to select resistant varieties.
- Chemical control: not a method to use.



Photo 1. Collapsed cooking banana infected by the blood disease bacterium, *Ralstonia syzygii* subsp. *celebesensis*.



Photo 2. Vascular stain in a banana stem infected by the blood disease bacterium, *Ralstonia syzygii* subsp. *celebesensis*.



Photo 3. Male bud (or 'bell') with rot (arrowed), caused by blood disease bacterium, *Ralstonia syzygii* subsp. *celebesensis*.



Photo 4. Fruit cut to show vascular staining caused by the blood disease bacterium, *Ralstonia syzygii* subsp. *celebesensis*. Note, skin of fruit is still green.



Photo 5. Vascular staining in the fruit

stalk of a banana with blood disease caused by the bacterium, *Ralstonia syzygii* subsp. *celebesensis*.



Photo 6. Fruit stalk cut lengthways to show the brown streaks in the vascular tissues caused by the banana blood disease bacterium, *Ralstonia syzygii* subsp. *celebesensis*.

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Information from Drenth A, Kema G (2021) The vulnerability of bananas to globally emerging disease threats. *Phytopathology* 111: 2146–2161; and Blood disease (2018) NSW Department of Primary Industries. NSW Government; Eden-Green SJ (1994) *Musa* Disease Fact Sheet no. 3. International Network for the Improvement of Banana and Plantain, Parc Scientifique Agropolis, 34397 Montpellier Cedex 5, France; and Blomme G, et al. (2017) Bacterial diseases of banana and enset: Current state of knowledge and integrated approaches toward sustainable management. *Frontiers in Plant Science*. (<https://www.frontiersin.org/articles/10.3389/fpls.2017.01290/full#B66>); and Davis RL, et al. (2001) Blood disease and panama disease: two newly introduced and grave threats to banana production on the island of New Guinea. In: *Proceedings of the Papua New Guinea Food and Nutrition 2000 Conference*. PNG University of Technology, Lae, 26–30 June 2000. ACIAR Proceedings No. 99, xviii + 892p.; and CABI (2019) Blood disease bacterium (blood disease bacterium of banana). Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/446702>); and FreshPlaza. Banana blood disease poised to spread throughout Southeast Asia. Plant Disease. The American Phytopathological Society. (<https://apjournals.apsnet.org/doi/10.1094/POIS-01-21-0149-RE>); and from Drenth A (2020) Reversing the impact of Banana blood disease in Indonesia. APBSF Project Final Report PBSFO16: 22pp. (<http://www.apbsf.org.au/wp-content/uploads/2020/06/PBSFO16-Drenth-Banana-Blood-Disease-Final-Report.pdf>). Photos 1–5 Jane Ray, Centre for Horticultural Science, The University of Queensland, Brisbane, QLD 4001, Australia. Photo 6 Davis RL, Liberato JR (2006) Banana blood disease (Blood disease bacterium). PaDIL - <http://www.padil.gov.au>.

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*The codes ABB and BBB are determined by the proportion of *Musa acuminata* and *Musa balbisiana* (original species) represented in any variety. An internationally recognised scoring system is used to determine the proportion.

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