

# Control of fungal contamination in the accelerated ageing test of *Brassica* spp. by seed surface sterilisation.



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## Summary

The high temperature and humidity used for the AA vigour test procedure for *Brassica* spp. allow the growth and multiplication of fungi on the seeds, the presence of which may negatively affect the post-ageing germination. Seeds from 3 seed lots each of a turnip-rape hybrid (*B. rapa* x *B. campestris*) and Asian kale (*B. oleraceae* var. *alboglabra*) were surface sterilised (SS) in 1% NaOCl before being placed into the ageing chamber. Their post-ageing germination was then compared with seeds without SS. Post-ageing germination of 5 of the 6 SS seed lots was significantly increased because of a reduction in abnormal seedlings. While SS did not completely prevent fungal growth, this pre-treatment deserves further investigation for the AA testing of small seeded species.

## Introduction

- The high temperature (41 to 45°C) and high humidity (96% RH) of the AA test encourage fungal growth on *Brassica* seeds (Fig. 1).
- Does the presence of these fungi influence the post-ageing germination?
- Can this fungal growth be prevented by seed surface sterilisation, a pre-treatment commonly used in health testing?

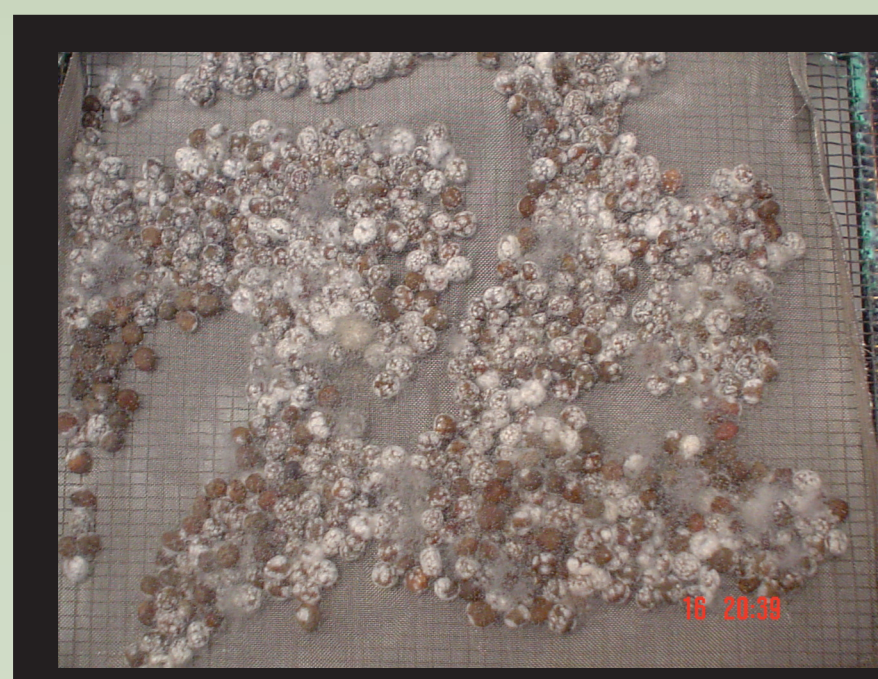


Fig. 1 Example of a seed lot with high fungal infestation after 72h of ageing.

## Methodology

- The ISTA AA method for soybean (41±0.3°C for 72h at 96% RH) was used.
- Three seed lots of *B. rapa* x *B. campestris* and *B. oleraceae* var. *alboglabra* with a germination of >90% and SMC between 6.3-6.9% were tested.
- One set of 1g seed/lot was surface sterilised (SS) (Fig. 2) before ageing while the other was not (NSS).
- After ageing for 72h, the seeds were scored for fungal growth using a 3 grade system where 'high' = 70 – 100% seeds infested, 'medium' = 40 – 70% seeds infested, 'low' = 1 – 40% infested.
- Seeds were then tested for germination and SMC.
- Field emergence was recorded following hand sowing (4 x 100 seeds/lot) in May, June and September at Lincoln University.

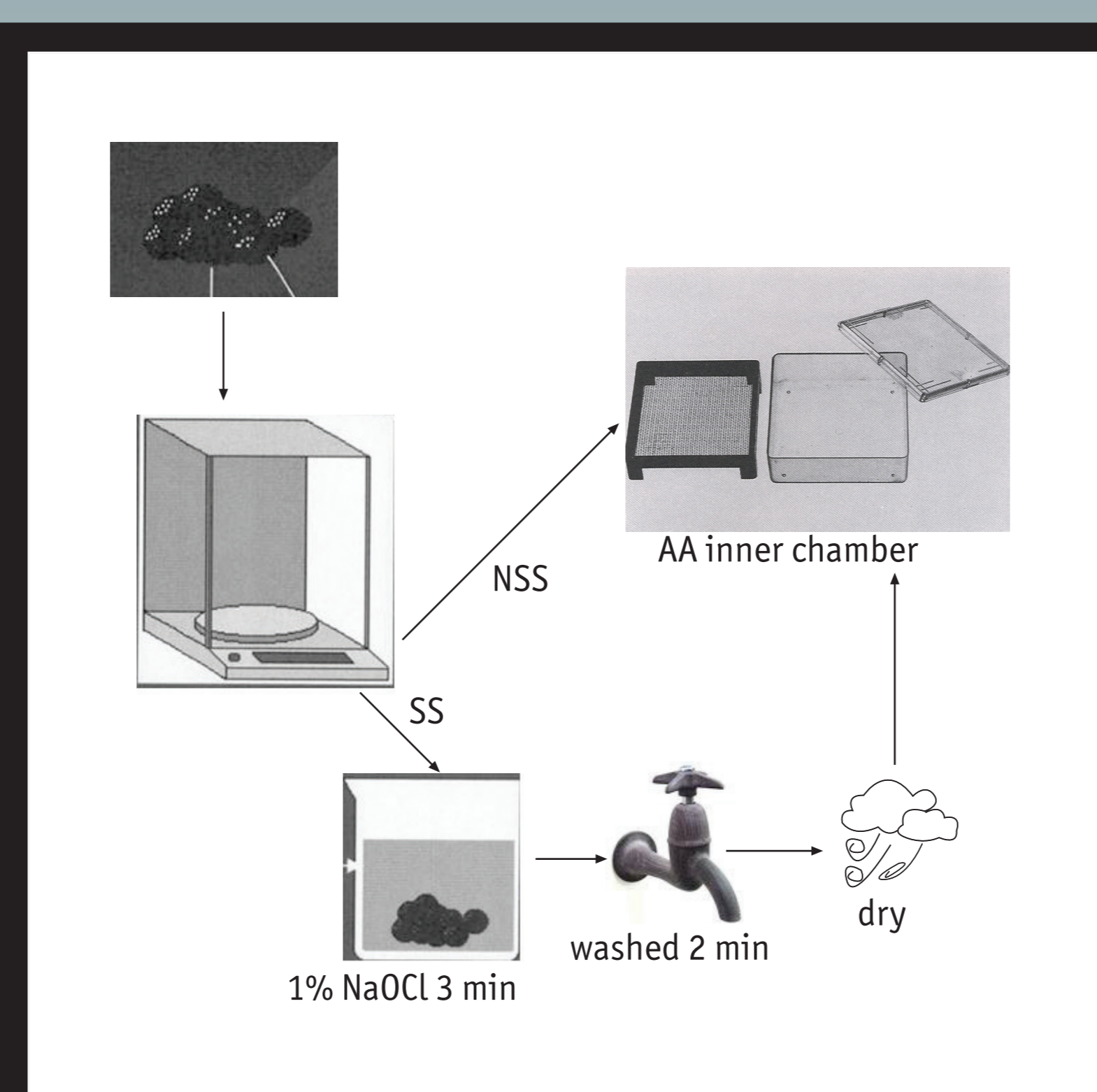


Fig. 2. Surface sterilisation of seeds before ageing

## Results

- SMC after ageing did not differ between SS and NSS seeds (data not presented)
- For NSS, fungal score after ageing was either high (2 seed lots) or medium (4 seed lots), while for SS fungal score was either low (4 seed lots) or nil (2 seed lots).
- Germination of the non-aged control was >94% for all seed lots. Ageing reduced the germination of all seed lots (Fig. 3) and there were significant differences among NSS and SS in both species.
- With one exception, SS resulted in fewer abnormal seedlings (Fig. 3).
- Field emergence was from 10 – 28% lower than the standard germination depending on seed lot and sowing time (Table 1). For seed lot 3, the post-AA germination following SS was more representative of that seed lot's field performance than the NSS post-AA germination.

## Acknowledgements

PGG Wrightson Seeds and Smith Seeds Ltd for supply of seed lots; AgriQuality NZ Ltd for use of seed testing facilities at NZDL04.

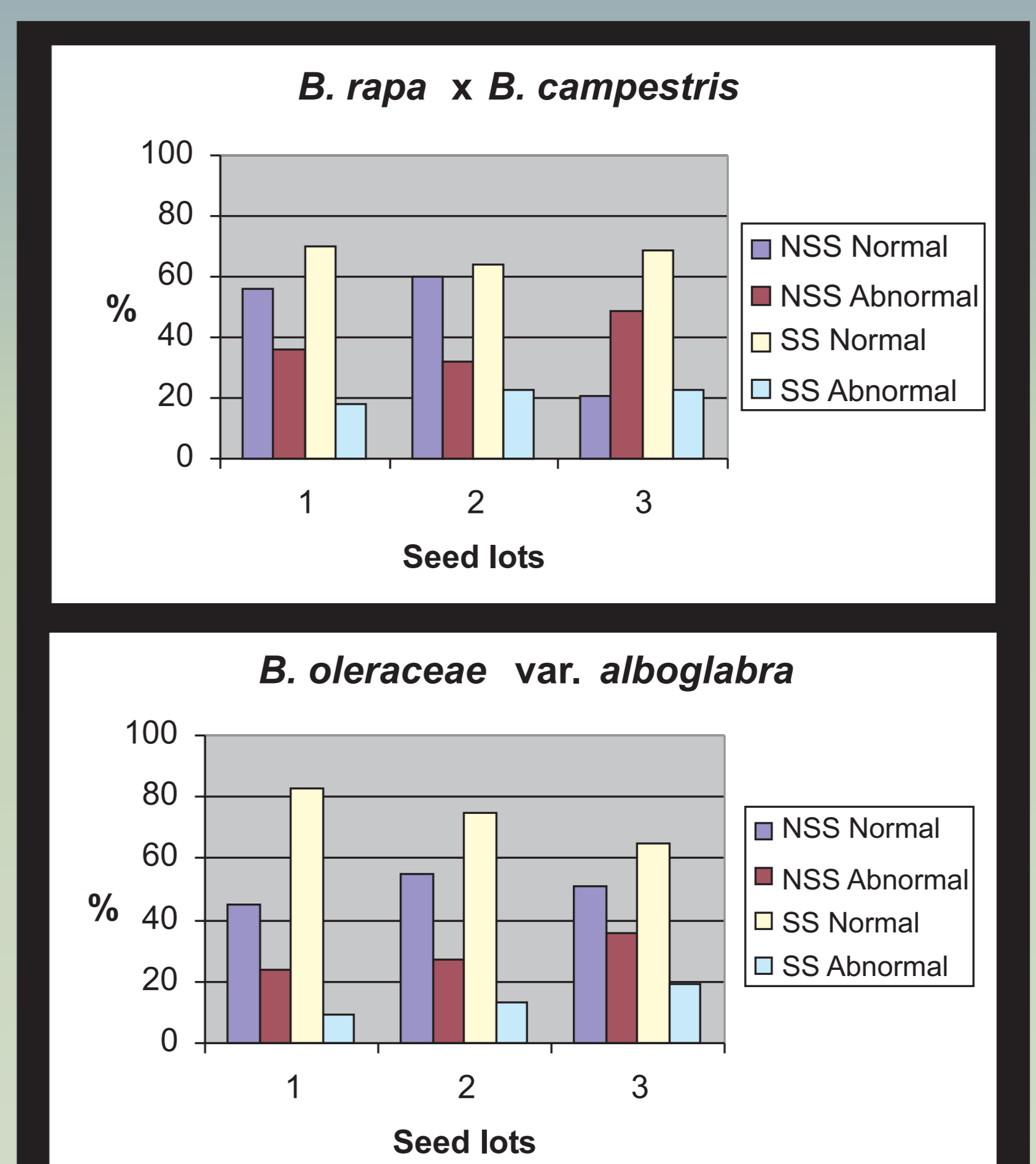


Fig.3 Effect of surface sterilisation (SS) on post-ageing germination of *Brassica* seed lots

Seed lot	Std Germ <sup>n</sup> (%)	Post-AA Germ <sup>n</sup> (%)		Field Emergence (%)		
		NSS <sup>1</sup> (%)	SS <sup>2</sup> (%)	S1 <sup>3</sup>	S2	S3
1	95	56	70	75	79	80
2	96	60	64	79	72	72
3	94	21	69	85	68	80

<sup>1</sup>NSS = not surface sterilised; <sup>2</sup>SS = surface sterilised; <sup>3</sup>Sowings in May, June and September at the same site.

Table.1 Field emergence data for three sowings of three seed lots of *B. rapa* x *B. campestris* for comparisons with germination and vigour test data.

## Conclusions

- Decayed roots and decayed/lesioned cotyledons were a direct result of fungal damage.
- Completely/partially removing these fungi by SS reduced this damage and allowed higher post-AA germination.
- Fungi present on the seed surface during the AA test have been presumed to be saprophytes. Whether the seedling damage recorded was as a result of a pathogen(s) requires investigation.
- Whether SS improved the relationship between AA test results and field performance requires further work.
- Using SS as a pre-treatment for the AA test of small seeded species shows promise and deserves further investigation.