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Multiplication of *Cunonia macrophylla* and *Geissois pruinosa*, Cunoniaceae species with potential economic interests growing on New Caledonian "maquis minier".

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Photo 1 : *G. pruinosa* in flowers

The two endemic Cunoniaceae species *Geissois pruinosa* Brongniart & Gris (photo 1) and *Cunonia macrophylla* Brongniart & Gris (photo 2) which essentially grow on New Caledonian "maquis minier" (healthy formations on ultrabasic rocks) were recognised for their pharmaceutical, cosmetic and horticultural interest.

Cunonia macrophylla in particular showed important antimicrobial potentialities (photo 3) and molecules responsible of these activities were investigated. Chemistry analysis revealed the presence of large amount of tannins.

Propagation techniques using cuttings and seeds were investigated to determine a better way of multiplying them with the idea of using it in revegetation.



Photo 2 : *C. macrophylla* flowers



Photo 3 : Antibiotic effects of methanolic extracts of leaf, root and flower of *C. macrophylla* against *Corynebacterium accolans*

Germination studies

The first objective was to determine the effects of different abiotic factors as temperature, soaking level and light on the germination capacity of seeds (photos 4, 5) and also to determine the optimal germination conditions.

In our experimental conditions, optimal temperature was 22-23°C for *C. macrophylla* and 27-28°C for *G. pruinosa* (figure 1). Soaking level was 12 mL and light has no effects for both species.

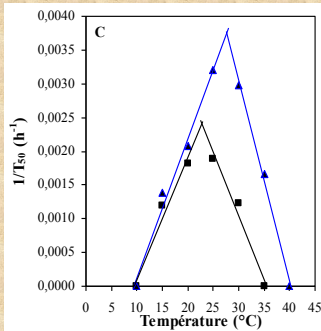


Figure 1: Effect of temperature on the germination for *G. pruinosa* (▲) and *C. macrophylla* (■)



Photo 4 : *G. pruinosa* seed

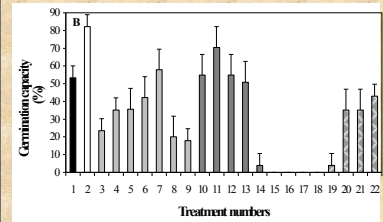
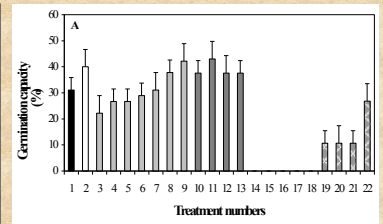


Photo 5 : *C. macrophylla* seed

In order to optimise germination several treatments were tried : cold or hot water and sulphuric acid exposure, mechanical scarification and osmoconditioning.

Mechanical scarification appears to be the most efficient and profitable for the two species (figure 2).

Figure 2: Maximal germination capacity of seeds of *Geissois pruinosa* (A) and *Cunonia macrophylla* (B) at 25°C in response to different pre-treatments. Treatment number : 1 = Control. 2 = Mechanical scarification. 3 = 4°C, 2 days. 4 = 4°C, 4 days. 5 = 4°C, 7 days. 6 = 4°C, 10 days. 7 = 4°C, 14 days. 8 = 4°C, 21 days. 9 = 4°C, 28 days. 10 = Hot water at 30°C. 11 = Hot water at 40°C. 12 = Hot water at 50°C. 13 = Hot water at 60°C. 14 = Hot water at 70°C. 15 = Hot water at 80°C. 16 = Hot water at 90°C. 17 = Hot water at 100°C. 18 = Sulphuric acid 95-97%, 5 min. 19 = Sulphuric acid diluted to 1/2, 5 min. 20 = Sulphuric acid diluted to 1/4, 5 min. 21 = Sulphuric acid diluted to 1/8, 5 min. 22 = Sulphuric acid diluted to 1/16, 5 min.



Propagation by cuttings

Cuttings of *C. macrophylla* (photo 6) and *G. pruinosa* with or without apical bud were cultured in different conditions after disinfection:

- on soil (1/2 vermiculite + 1/2 compost) with or without addition of phytohormones (ANA, BAP or ANA+BAP at different concentrations)
- on water with or without addition of sucrose



Photo 6: Cuttings of *C. macrophylla* in green house



Photo 7: Rooting after 6 months of culture obtained on cuttings of *C. macrophylla* on soil (right), in water with (middle) and without (left) sucrose. Large view (a) and zoomed (b)

Observations showed the importance of the apical bud to obtain a well-rooted plant, and the possibility of profitable hydroponic culture for significant plant production

In vitro culture

In vitro culture has the advantage of producing large quantities of plants when methods are optimised. For this reason we defined culture methods using leaves, stem or roots of *C. macrophylla* and *G. pruinosa*.

Best results were obtained with the species *G. pruinosa* as we got large plants using leaves as well as stem (figure 3). In both case one sample give between 10 and 15 plants with the possibility of producing big amounts of callus which are liable to give more plants.

For *C. macrophylla*, we also obtain callus from leaves but no large plant at this time. However, we proved that they are able to produce antibiotic effects as well as leaves of adult plant.

Figure 3: *In vitro* propagation of *G. pruinosa* started from leaf or stem

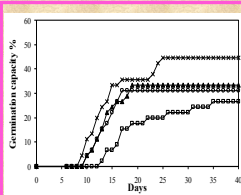
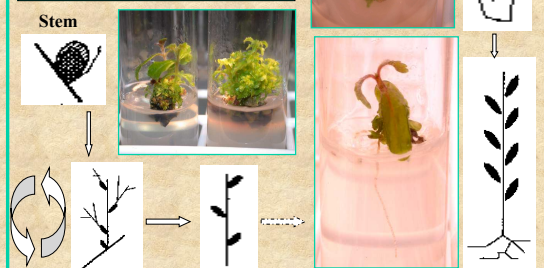


Figure 4: Effect of nickel on the germination of *G. pruinosa*. Control, O Ni 10 ppm, ▲ Ni 100 ppm, ☒ Ni 1000 ppm

Influence of some characteristic elements of the serpentine syndrome, nickel, magnesium or calcium on the germination of *C. macrophylla* and *G. pruinosa* (figure 4) revealed different adaptations. Studies on their development on different mining soils and effects of increasing nickel concentrations, especially for *G. pruinosa* (figure 5), confirm these differential behaviour.

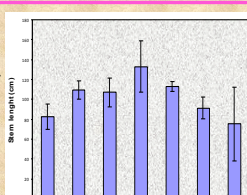


Figure 5: Effect of increasing nickel concentrations in watering solution on *G. pruinosa* growth.