

Myoga ginger - a new export crop for New Zealand

J. A. Douglas and J. M. Follett

New Zealand Institute for Crop & Food Research Ltd., Ruakura Research Centre, Private Bag 3123, Hamilton, NZ

Abstract

Myoga ginger (*Zingiber mioga*) is a native perennial of Japan used as a traditional Japanese vegetable grown for either its spring shoots or the summer/autumn flower buds. The production of flower buds is highly seasonal and consequently there is an opportunity for a southern hemisphere producer such as New Zealand to supply myoga to Japan when local supplies are low. Myoga has been vigorous and largely disease and pest free on the free draining Waikato soils but it is subject to more root rots on poorer drained soils. Under New Zealand conditions myoga top growth sunburns without shading and consequently trials have been established under 50% shade cloth. Myoga flower buds develop from unground stems on the edge of the plant mass and to achieve top quality produce the buds should be picked before they emerge and turn green. To facilitate this, a 10-15 cm layer of sawdust was applied so that the buds could be located by fossicking and picked. Picking was carried out every 2-3 days over a 2-month period from late January until early April. Myoga production beds established with 30 cm between rhizomes and 1 m between rows have yielded 6.75 t/ha of flower buds in the second year. A second two-year-old crop yielded 13.5 t/ha.

These yields are comparable to and exceed Japanese production levels. Myoga is a very new crop in New Zealand with little crop grown commercially. There remains considerable research to be undertaken to define its agronomic management but research results to date and the successful test marketing of New Zealand-grown myoga indicate that it is likely to be a successful new crop for New Zealand.

Additional key words: *Zingiber mioga, Japanese markets, vegetable,*

Introduction

Myoga ginger (*Zingiber mioga* Roscoe), a cold-tolerant member of the ginger family (Zingiberaceae) Palmer (1990), is a native perennial of Japanese woodlands (Ohwi, 1965). It is a traditional Japanese vegetable grown for both spring shoots and summer/autumn flowerbuds (Follett, 1986). The production of flowerbuds is highly seasonal and consequently there is an opportunity for a southern hemisphere producer such as New Zealand to supply myoga to Japan when supplies are low. New Zealand product would be expected to be supplied in the January-May period when prices in Japan are at their highest (Fig. 1). Currently there is no foreign supplier of myoga to the Japanese market.

Preliminary research on myoga was conducted in New Zealand by Palmer (1984) and following an investigation of Japanese production systems (Follett, 1986) a further six plants were introduced through closed quarantine to ensure freedom from pest and diseases. This paper reports on the preliminary findings of the research undertaken at Ruakura Agricultural Centre since 1986.

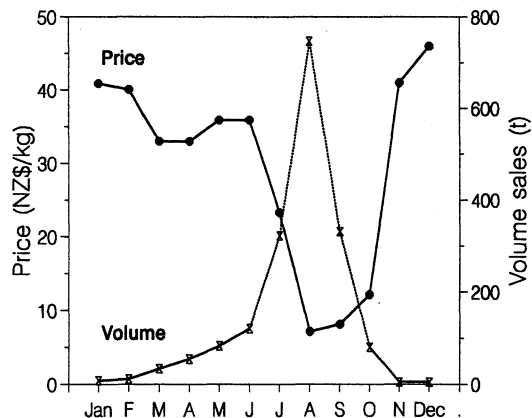


Figure 1. Myoga ginger flowerbud auction prices and volumes sold - Tokyo market 1991 (NZ\$1 = 69 yen).

Production Requirements of Myoga

Myoga is a sterile pentaploid propagated by root division (Palmer, 1984). The plant is established from rhizome sections with faster and more even plant emergence from cool stored rhizomes (Follett, 1991). The plant top growth is frost sensitive and dies down in winter but the dormant rhizomes have proved to be quite winter hardy (Palmer, 1984). Myoga growth in the Waikato on the free draining Horotiu sandy loam has been vigorous and largely pest and disease free. On less well drained soils in the Waikato such as Bruntwood and Te Kowhai silt loams rhizome rotting from *Fusarium* and *Pythium* infection has been noted.

Under Waikato conditions, myoga top growth sunburns and becomes chlorotic without shading. A light response curve obtained using a climate-controlled mini curvette system (Buwalda *et. al.*, 1991) showed that maximum photosynthesis occurred when the light level (photosynthetic photon flux density) was approximately 1000 $\mu\text{mol}/\text{m}^2/\text{second}$ (Fig. 2). Shading with 50% shade cloth in the field has overcome the high light effects and given good myoga growth. Further research is needed to assess whether less shade can be tolerated.

In Japan myoga crops for flowerbud production are established using rhizomes planted in two rows 12 cm apart with 60 cm between the double rows (Follett, 1986). From an agronomic point of view the continuous rhizomatous spread of the crop raises fundamental questions of how best to establish and manage this crop to optimise production. In our trials a single rhizome had spread to cover an area of 0.3 x 0.5 m in three seasons. In rows, rhizomes planted 40 cm apart gave continuous rows 0.5 m wide after two

seasons' growth. Consequently, management of the crop spread is an important issue. A trial investigating the influence of various row configurations on crop production and ease of management has been established.

Myoga flowerbuds develop at ground level from adventive shoots on mature rhizomes. They are strongly seasonal in emergence and in the Waikato the production period is dominantly February and March extending into April. This production begins earlier in the Auckland region and later in the South Island but precise information is limited on this point. To achieve top quality produce the flowers need to be picked before they emerge and turn green in the light. To facilitate this, 10-15 cm of sawdust is used to maintain the buds in good condition and provide an easy substrate from which to locate and pick the buds. Only buds at the appropriate maturity should be picked. We estimate that one person can select and pick 10 kg of buds/hour. The buds develop through a maturity cycle until the floral parts emerge. Further information is needed on how long a single bud remains within the exportable grade before it becomes over-mature. This information will provide a guide on how regularly a crop needs to be picked. We suggest picking 2 or 3 times a week.

Flowerbud Production

The original myoga planting was two 10 m long rows, 1 m apart, established in spring 1987. By summer 1989 the canopy between the rows had closed. The flowerbud harvest in 1989 yielded 6.7 t/ha with an average bud weight of 14 g. Subsequent grading and test marketing of some of this product in Japan indicated that many of the buds were harvested over-mature and were rejected. Product which was harvested at the ideal maturity stage was considered excellent.

A second trial planted in November 1990 was made using rhizomes planted in 1 m rows at 0.4 m spacings. Six quadrat samples were recorded of the biomass and flowerbud production in March 1992. From these

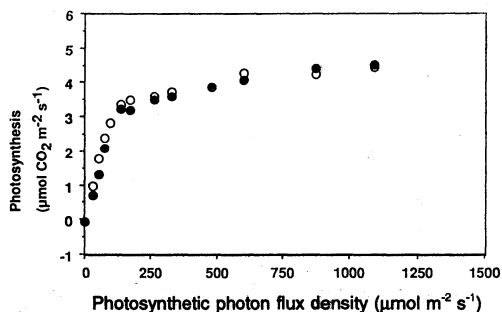


Figure 2. Photosynthesis in two myoga ginger plants measured at different light levels.

Table 1. Myoga plant biomass and flowerbud production from a 2-year-old crop - March 1992.

Number of stems (000's/ha)	518.33 ± 73.5
Wet weight of stems (t/ha)	95.50 ± 16.3
Dry weight of stems (t/ha)	7.59 ± 1.4
Flowerbud production (000's/ha)	1664.0 ± 204.0
Flowerbud weight (t/ha)	13.52 ± 1.7
Average flowerbud weight (g)	8.1

flowerbud production was calculated at 13.52 t/ha with an average weight of 8 g/bud (Table 1).

This flowerbud yield is about double that produced in the higher production areas of Japan (Follett, 1986). However, this does come from a young stand and it is not known whether the yield will stabilise at a lower level as the plantings mature.

Conclusion

The preliminary research on myoga has shown that the crop grows very well in the Waikato and that excellent quality flowerbuds can be produced. Currently very little myoga is grown commercially in New Zealand but interest created by this research should see a rapid rise in production during the next few years. Research on myoga is in its infancy and considerable research is needed to define its agronomic management to optimise flowerbud production over a period of years. Research results to date and the successful test marketing of New Zealand-grown myoga indicate that it is likely to be a successful new crop for New Zealand.

References

- Buwalda, J.G., Meekings, J.S. and Smith, G.S. 1991. Seasonal changes in photosynthetic capacity of leaves of kiwifruit (*Actinidia deliciosa*) vines. *Physiologia Plantarum* 83, 93-98.
- Follett, J.M. 1986. Production of four traditional Japanese vegetables in Japan. Ruakura Agricultural Centre, Special Publication. ISBN. 0-477-03082-3: pp. 51.
- Follett, J.M. 1991. Propagation notes for new and novel crops introduced into New Zealand. *International Plant Propagator's Society, Combined Proceedings 41*, (in press).
- Palmer, J.A. 1984. Myoga, a possible ginger crop for New Zealand. *Royal NZ Institute of Horticulture Annual Journal 12*, 105-108.
- Palmer, J.A. 1990. The true gingers. An introduction to the genus *Zingiber*. *Growing Today, September 1990*, 36-37.
- Ohwi, J. 1965. Flora of Japan. Publ. Smithsonian Institution, Washington DC.
- Tokyo Wholesale Market Statistics 1991. publ. Tokyo Central Wholesale Market Secretariat: pp. 206.