

Development of cultivars with fast fruit development suited for growing in Northern Europe

Torben Bo Toldam-Andersen^{1*}; Oliver Trapp²

¹FastGrapes, Maaloev, Denmark

²Julius Kühn Institute, Siebeldingen, Germany

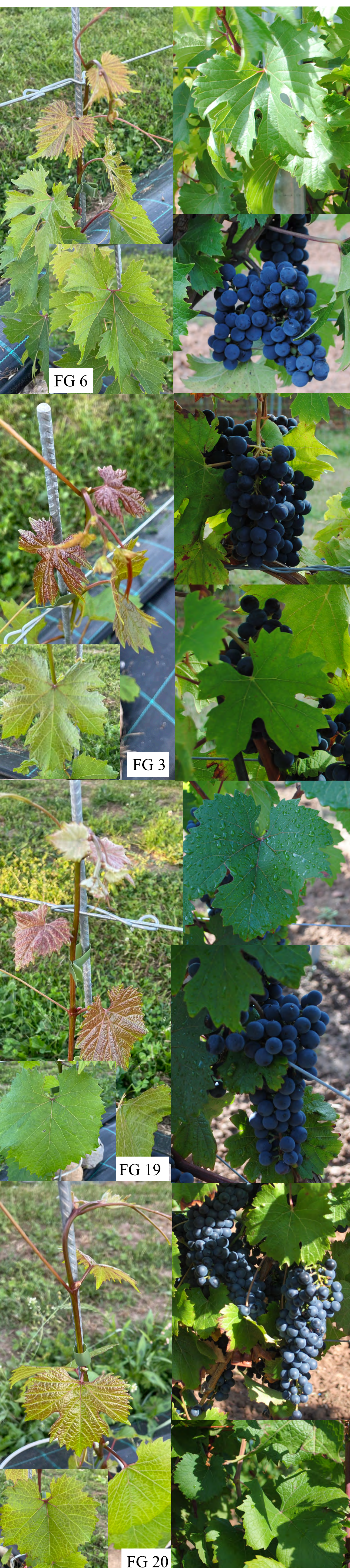
*torbentoldam-andersen@fastgrapes.dk

Abstract

For the first time breeding of grapes for a growing region as cold as in Northern Europe/Scandinavia has been initiated. The breeding is established in a cooperation between a small private breeding company 'FastGrapes' established by Toldam-Andersen, T. B. and the Julius Kühn Institute. From almost 8000 seedlings in the fields at Geilweilerhof 29 early ripening breeding lines has been identified and the goal is in a few years to have 40 lines identified when new fields with breeding lines can be screened. A fast track testing system has been designed with the goal to have the first new cultivars released in 10 years from now.

The new wine industry in Scandinavia

The cultivar 'Solaris' has become the dominant cultivars in Denmark and Sweden, but is even grown in Norway. In Denmark it use 95 days from flowering to harvest maturity (based on country average of the last 15 years) which is reached by 1st October (+/- 15 days). This is an ideal time of maturity, as high quality grapes can be harvested every year. Solaris now represents approx. 40% of the commercial viticultural area in Denmark. In total approx. 200 ha is grown, and the area show exponential growth.



The selection

In the new breeding program, we use Solaris as reference cultivar. The work was initiated in 2020 where about 5000 seedlings at Geilweilerhof was screened 15-18 August. 40 potential genotypes were identified from which 25 was selected for further testing. In 2021 an additional 2850 seedlings were screened adding 4 new selections to the list. Further selection will be performed in the coming years. In addition to time of maturity an array of parameters are evaluated (eg. yield components, growth habit and disease tolerance). Micro vinified wines are also evaluated.

The genetic background

Depending on the crossing partners used between 0,5 and 2 % segregates out as fast maturing genotypes. A complex genetic background of the seedling fields has been developed over almost 200 years of breeding. Recently, a line from INRA bring in new resistance genes from Muscadinia (Töpfer and Trapp, 2022). As a result, multiple resistance loci is found in the selected FastGrapes breeding lines against downy and powdery mildew (see table 1).

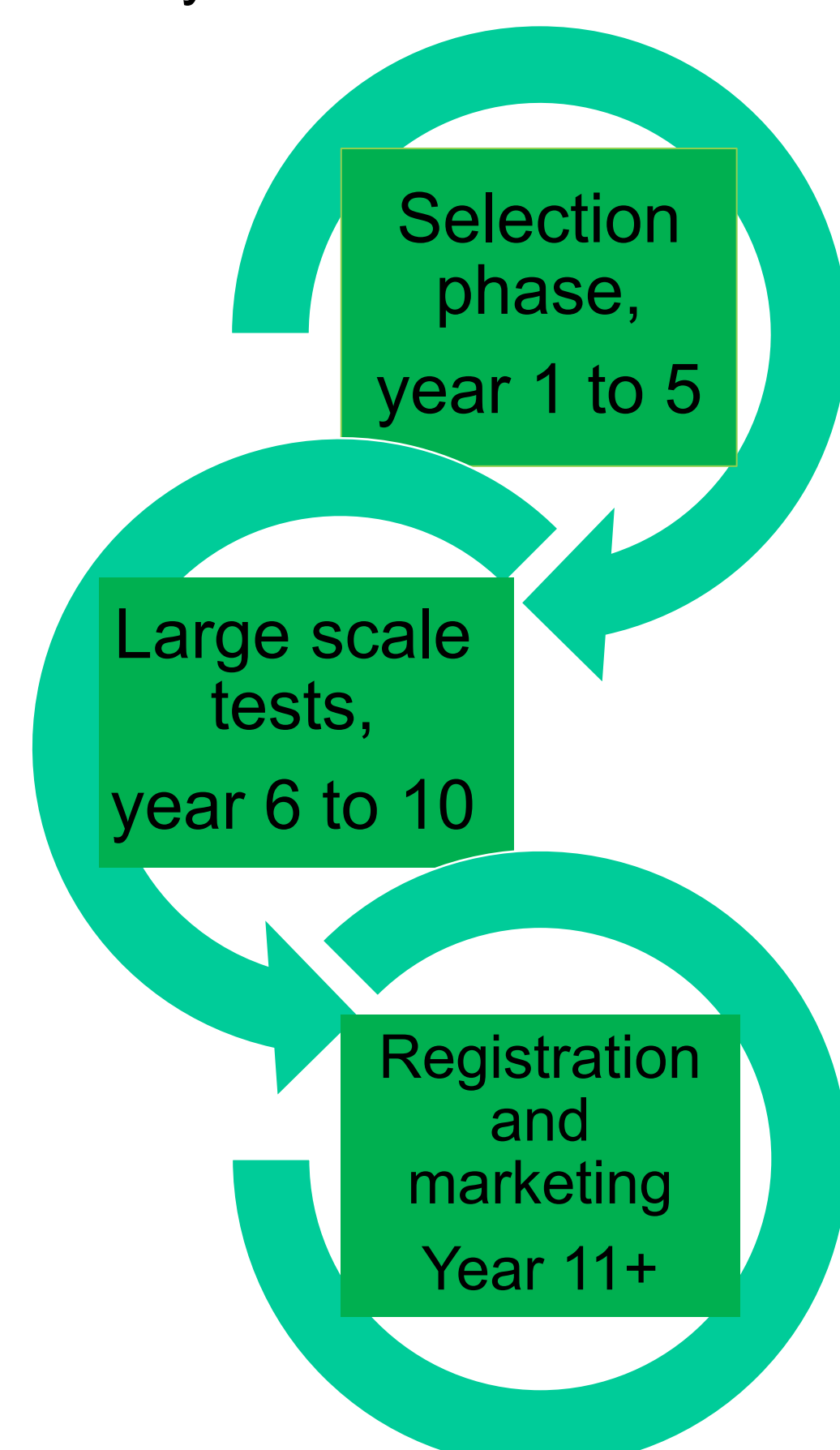
Table 1. Loci profiles of FastGrapes breeding lines. Measured by JKI. '+': Heterozygous, '++': Homozygous.

FG Line no	Fruit color	Powdery mildew loci			Downy mildew loci				
		Run1	Ren9	Ren3	Rpv1	Rpv3.1	Rpv3.2	Rpv10	Rpv12
1	Green	-	+	+	-	-	+	?	-
2	Blue	+	++	+	+	-	-	-	+
3	Blue	+	-	-	+	-	-	-	-
4	Blue	-	++	++	-	-	+	+(+)	-
5	Blue	-	-	-	-	+	+	?	-
6	Blue	-	+	+	-	-	+	+	-
7	Blue	+	+	+	+	+	-	-	-
8	Green	+	++	++	+	+	-	+	-
9	Green	+	+(+)	+	+	+	-	-	-
10	Green	+	+	+	+	+	-	+	-
11	Blue	+	-	-	+	+	-	+	-
12	Blue	+	-	-	+	+	-	-	-
13	Green	+	-	-	+	-	-	+	-
14	Green	+	-	-	+	-	-	+	-
15	Green	+	-	-	+	+	-	-	-
16	Green	+	-	-	+	+	-	-	-
17	Green	+	-	-	+	+	-	-	-
18	Blue	+	+	-	+	+	-	-	-
19	Blue	+	+	+	+	+	-	-	-
20	Blue	+	-	-	+	-	-	+	-
21	Green	+	-	-	+	-	-	-	-
22	Blue	-	+	+	-	-	+	+	-
23	Blue	+	-	-	+	-	?	-	?
24	Green	+	-	-	+	+	-	-	-
25	Green	+	-	-	+	+	-	+	-
26	Blue	+	+	+	+	+	-	+	-
27	Green	+	+	+	+	+	-	+	-
28	Blue	+	-	-	+	+	-	-	+
29	Blue	+	-	-	+	+	-	-	-
Solaris	Green	-	+	+	-	-	-	+	-

* Solaris also have Rpv3.3. The seedlings have not been tested for Rpv3.3

The fast track strategy

A 'fast track' strategy has been developed, in which selected breeding lines are fast propagated with as many plants as possible in order to plant at 10 locations. 6 in Denmark, 2 in Sweden and 2 in Germany. Cultivar candidates are selected after two years of cropping (year 4 after planting). The candidates are then multiplied and planted in 5 locations with 200 of each in each place in order to allow for larger scale enology tests. Final selection for variety nomination is made after 2 years of large scale harvest. The ambition with the fast track procedure is to allow new cultivars to be developed in 10 years after selection in the seedling fields.



- Identification in seedling fields + propagation of mother plants
- Planting in 10 test fields in Denmark, Sweden and Germany
- Evaluation of viticultural traits and maturity over 2 years of crop

- 200 plants/line planted in 5 locations
- 2 harvest years with vinification tests
- Final selection of cultivar candidates

- Registration of cultivars
- Registration for growing
- Marketing of new cultivars

