

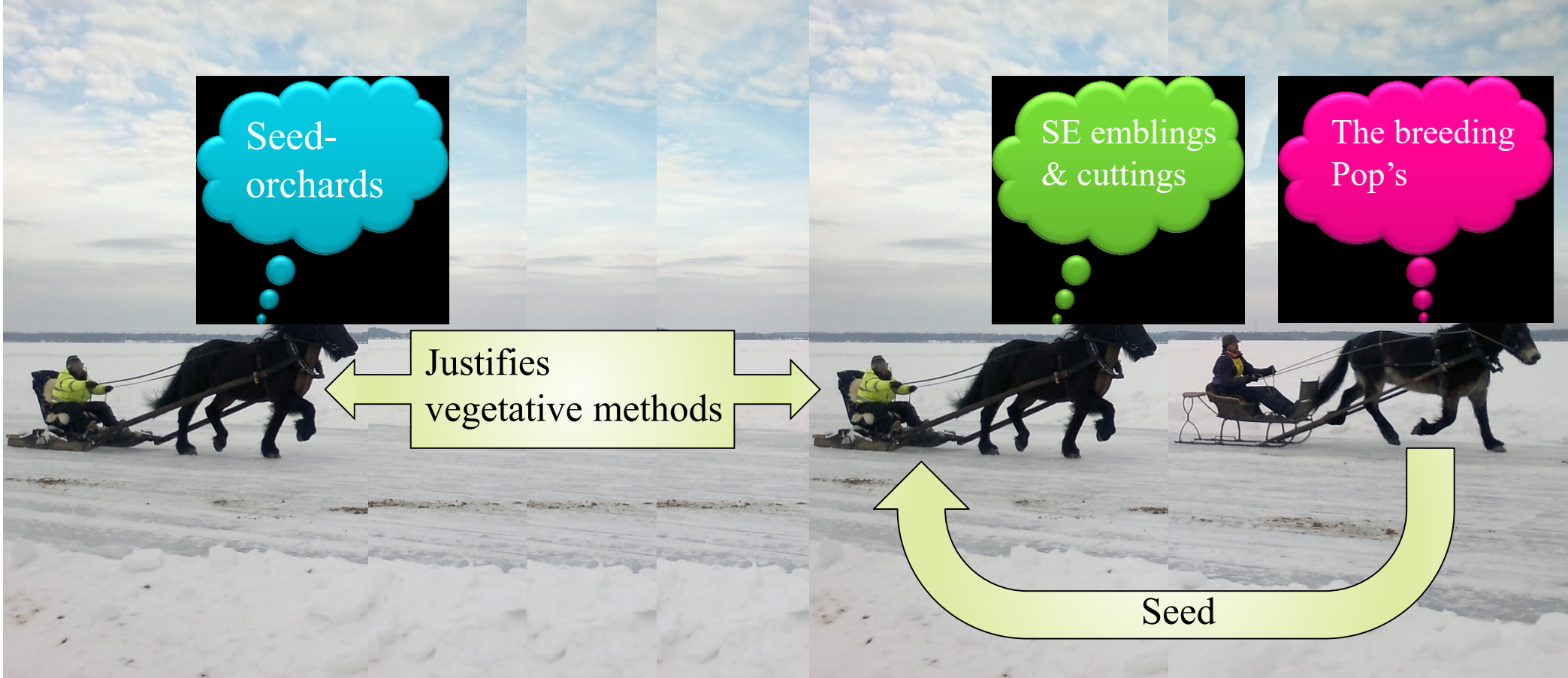
Without seed – no clonal forestry

At least in boreal conifers

HealGenCAR, Höör 2018-06-12



Curt Almqvist



Seed for cutting propagation

Desired production of cuttings (million per year)	No. of cuttings per stock plant	Annual need for new stock plants	Annual need for seed (kg)
1	50	20 000	0.22
	100	10 000	0.11
	200	5 000	0.05
5	50	100 000	1.1
	100	50 000	0.5
	200	25 000	0.3
200	50	4 000 000	43
	100	2 000 000	22
	200	1 000 000	11
200 as seedlings	1	0	2 000

Seed for vegetative methods



- Seed from crosses between best available material
- Production in an indoor seed orchard
- Increasing interest in cuttings & SE emblings in Sweden
- Current production of cuttings:
~ 1 – 1.5 million per year

Production costs



Greenhouse 22%



Tree management 50%



Moving around trees
15%

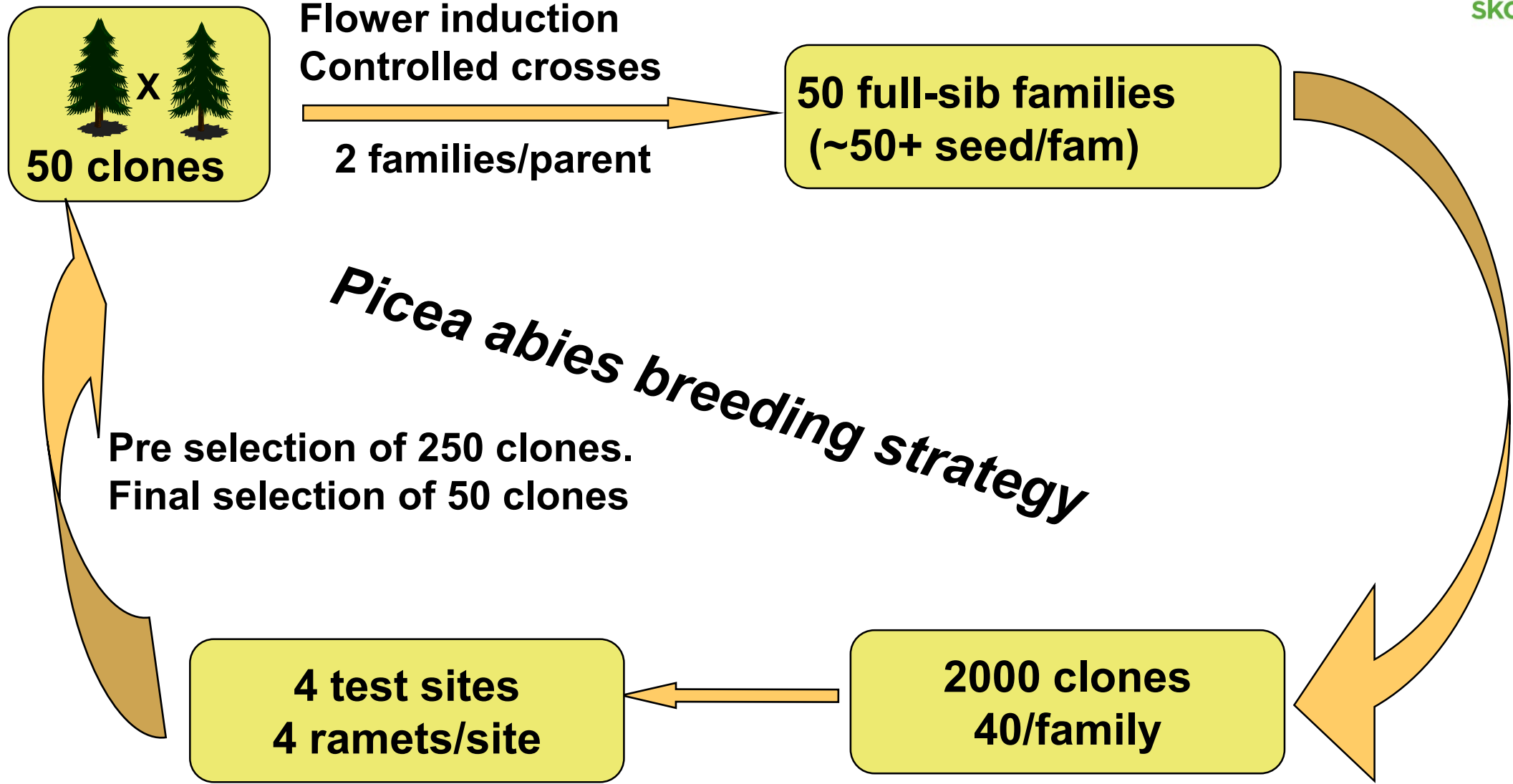


Pollen collection
8%



Flower stimulation
5%

Annual cost	Per seed	Per mother plant
22 220 €	9 cent	11 cent
30 750 \$	12 cent	15 cent



The breeding generates potted material for Indoor seed orchards



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Activity / Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Field trial establishment	X													
Early measurement						X								
Pre selection of candidates						X								
Grafting of candidates							X							
Growing of candidates in pots at nursery							X	X	X	X	X	X	X	X
Selection measurement												X		
Selection for next generation												X		
Flower stimulation of potted grafts													X	
Crossings start														X
Age from seed	6	7	8	9	10	11	12	13	14	15	16	17	18	19

The breeding generates potted material for Indoor seed orchards



From one spruce BP. One example

- 50 Fam's. Pre selection of 5 Clones/Fam → 250 Clones
- 5 potted grafts/Clone → 1 250 potted grafts
- After selection measurement: Selection of 3 Clones/Fam of the 30% best families → 225 potted grafts ready for use in an indoor SO

Sweden has 22 BPs for spruce

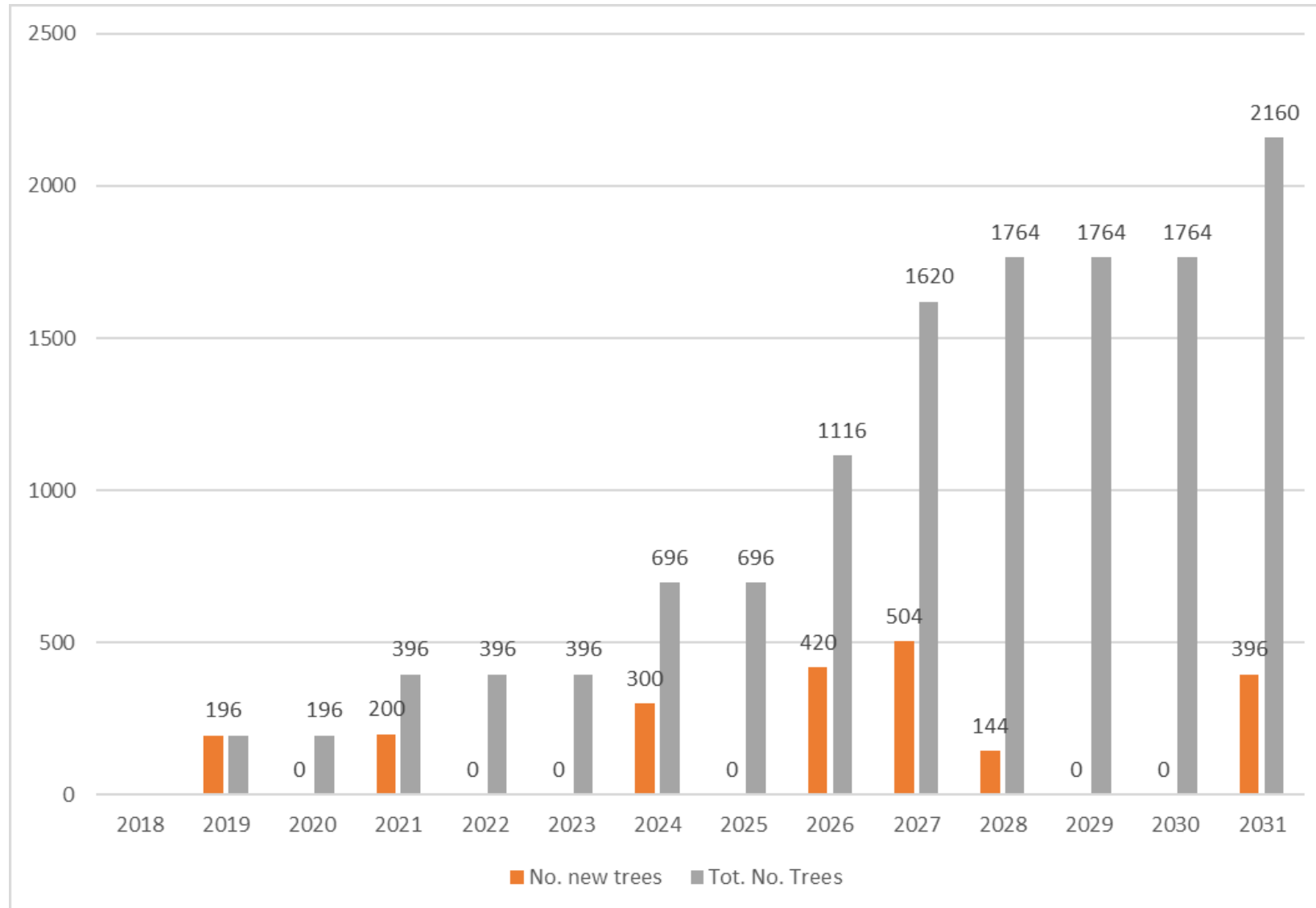


The breeding generates potted material for Indoor seed orchards



Project at startup together with one of Skogforsk's stakeholders

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Conclusions

- To be competitive vegetative propagation methods need to deliver higher genetic gain vs. seed orchards
- Vegetative propagation methods need seed from the best selections in the BPs
- The breeding generates a surplus of material that can be utilized for production of the needen seed
- The surplus material can be utilized in indoor SOs for seed production

