

EFFECT OF SPACING ON THE GROWTH OF HYBRID POPLAR

by

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Summary. A study laid out in irrigated plantation to find the effect of spacing on the rate of growth of *Populus euramericana* cv.I-214 has indicated that so far as diameter growth is concerned wider spacings (4.6×4.6 m and 5.5×5.5 m) are highly significant at 1% level as compared to closer ones (3.7×3.7 m, 2.7×2.7 m and 1.9×1.9 m). As regards height, the closest spacing has an edge over the rest.

Introduction. Planting of hybrid poplars in Pakistan was started in late fifties. Sufficient headway has since been made in nursery and field planting techniques, suitability of clones for different climatic zones and comparison of their rate of growth with other species. However, the spacing at which poplar should be planted is also important for this country because there is tremendous shortage of raw material for various end-uses and a final decision has to be taken as to the spacing and the rotation on which poplar should be grown for maximum volume production and/or the maximum quantity of good quality timber. It has been argued that owing to acute shortage of wood when even 1-2 year old poplar plants could be utilised, there was no point in planting the trees at a wider spacing and waiting for the produce for a period of 10 to 12 years. Also, that planting could be done at a close spacing with thinnings to get intermediate yield and providing enough growing space in the process. Although some studies on spacing of poplars have been conducted in many countries, yet the results could not entirely be applicable to Pakistan owing to different climatic conditions obtaining in this part of the world. Here due to comparatively longer growing season the rate of growth is faster. Simultaneously, low rainfall, high summer temperatures and poor edaphic conditions affect the plants adversely.

Materials and methods. For the study an area of 1.2 hectare was selected in Bhagat irrigated plantation (av. ann. rain 300 mm, 31.4° N. lat.). The plantation soil has been formed by alluvial deposits and is rich clayey loam. Water table fluctuates from 5-6 m and the temperature range is 5°C - 43°C . Frost occurs in January and February; hot winds blow in May and June.

After removal of originally planted shisham and mulberry trees, stumps and roots were dug out and the area thoroughly levelled with tractor. 1-year old plants of *P. euramericana* cv.I-214 were planted at the following spacings in 4 replications in a randomised block design on 26th and 27th February, 1974:

1.9×1.9 m	2.7×2.7 m
3.7×3.7 m	4.6×4.6 m
5.5×5.5 m	

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In all, 1460 plants were planted. An assessment of survival was made in May the same year with the following results:

Treatment (spacing) m	No. of plants planted	No. of plants surviving	Survival %age
1.9 × 1.9	676	675	100
2.7 × 2.7	324	294	91
3.7 × 3.7	196	186	95
4.6 × 4.6	144	138	96
5.5 × 5.5	120	111	92

Height and diameter were measured in December, 1977.

Results and discussion. The mean diameters (cm) for various spacings (m) are given below:

	1.9 × 1.9	2.7 × 2.7	3.7 × 3.7	4.6 × 4.6	5.5 × 5.5
R ₁	11.4	16.0	17.0	18.5	17.8
R ₂	11.9	15.8	17.3	18.8	19.8
R ₃	11.7	14.7	15.2	17.5	19.1
R ₄	12.2	15.5	16.8	19.3	19.3
Average	11.9	15.5	16.5	18.5	19.1

4.6 × 4.6 and 5.5 × 5.5 spacings form the best group giving diameters which are highly significant (1% level) as compared to the rest. 1.9 × 1.9 gives the smallest diameter growth.

The heights (m) are as follows:

	1.9 × 1.9	2.7 × 2.7	3.7 × 3.7	4.6 × 4.6	5.5 × 5.5
R ₁	16.2	14.9	14.3	15.2	14.0
R ₂	14.9	15.5	15.2	16.5	14.3
R ₃	15.9	14.0	15.9	15.2	14.0
R ₄	16.5	15.5	17.1	15.2	14.6
Average	15.9	14.9	15.6	15.4	14.2

5.5 × 5.5 spacing gave the poorest height, difference from other treatments being highly significant (1% level).