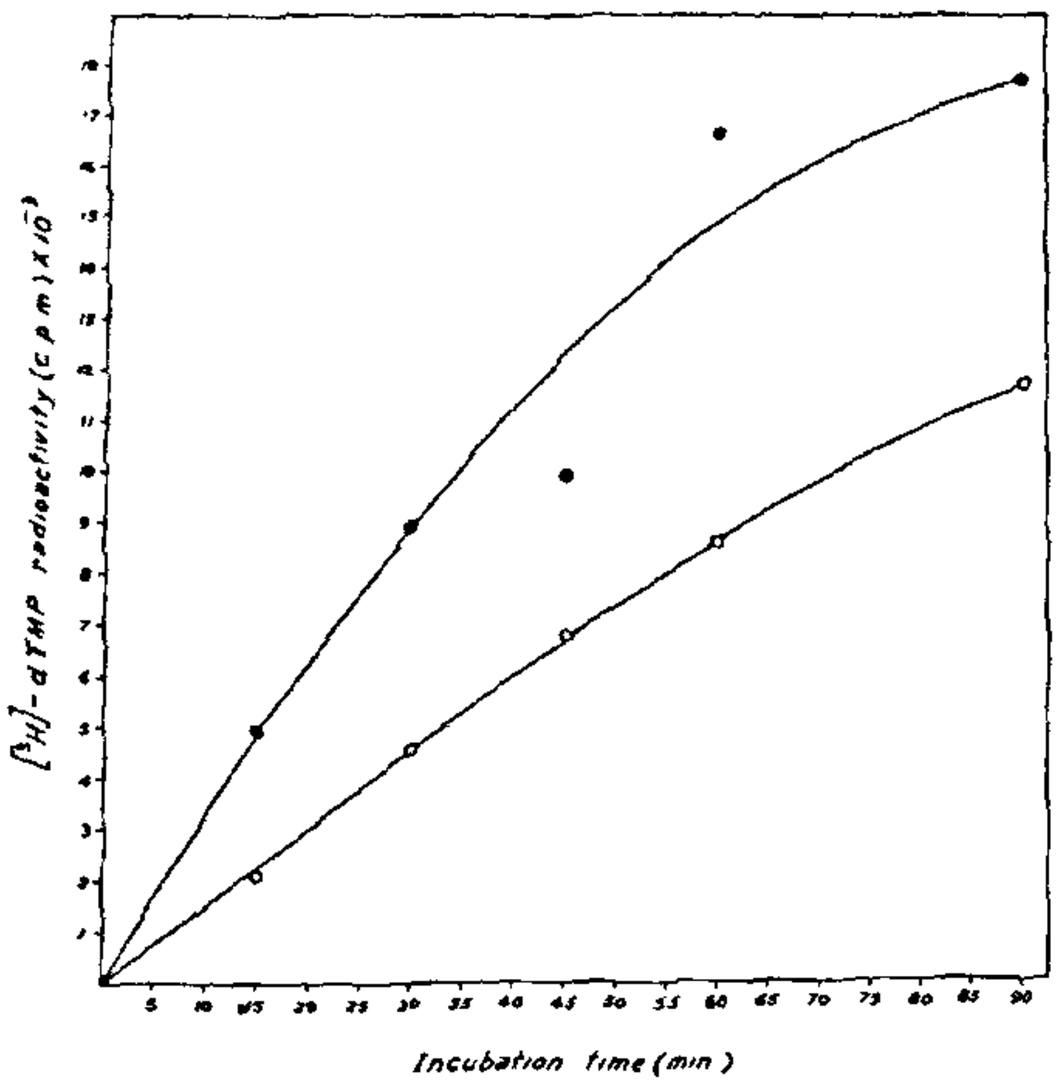

Figure 6. Comparative rate of incorporation of ^{3}H-dTMP into DNA by isolated plant nuclei and gall tissue nuclei. Open circle: Normal plant (sp. act. 9748 cpm/pmole). CLosed circle: Gall tissue (sp. act. 545 cmp/pmole).

vity increases with incubation and the extent of RNA and DNA synthesis by the gall nuclei is greater compared to the control. It is well known that germinating as well as rapidly proliferating neoplastic tissues show increased rate of macromolecule synthesis[13,14]. As the issue of oncogenesis is still wide open, this system being less complex to handle, could well be exploited as a relatively easier tool in understanding the process.

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SYNTHESIS OF NEW GENOTYPES OF *BRASSICA NAPUS* SUITABLE FOR CULTIVATION IN INDIA

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THERE is considerable emphasis for increasing the production of oil seeds in India because of their chronic shortage in recent years. Efforts have been made to improve *Brassica juncea* and *B. campestris*. *B. napus* with its inherent high yielding ability and relative resistance to aphids and alternaria affords promise of increasing the productivity. Since no indigenus *B. napus* cultivars are available while the exotic ones are photosensitive, very late and unsuited for commercial cultivation, under Indian agroclimatic conditions, artificial synthesis of *napus* from Indian forms of its diploid progenitors have to be resorted to *B. napus* ($2n = 38$, genome aa cc) is a naturalized alloploid of *B. campestris* ($2n = 20$, genome aa) and *B. oleracea* ($2n = 18$, genome cc). Two subspecies of campestris (*toria* and brown *sarson*) were used as the female parents and cauliflower (*B. oleracea*) was used as the male.

A total of 65,206 crosses were made using several techniques of hybridization to enhance the hybrid seed set but due to strong isolation barrier between the two species only 2 hybrids resulted. Bnt ($2n = 38$) from *toria* × *oleracea* arose as a spontaneous amphidiploid following hybridization whereas Bnbs ($2n = 19$) from brown *sarson* × *oleracea* was amphidiploidised using colchicine. Both these synthesized *B. napus* were intermediate between their parents and resembled naturally occurring *napus* in key morphological and taxonomical characters. Bnbs showed aberrant meiosis but, in Bnt it was more regular. By selection in A_2 and A_3 the meiotic behaviour was considerably stabilized in both and pollen and seed fertility improved.

The synthesized genotypes of *B. napus* Bnt and Bnbs had greater number of primary and secondary branches, exceeded their parents in length of bloom-

TABLE 1

Characters of synthetic B. napus and its parents along with natural napus

Character	*B. napus*			*B. campestris*		*B. oleracea*	
	Synthetic						
	Natural	Bnt	Bnbs	Toria	Brown sarson.	Cauliflower	C.D. at 5%
1. No. of primary branches	10.0	13.6	12.2	8.8	10.2	14.2	5.00
2. No. of secondary branches	30.2	34.4	32.2	24.4	31.0	41.5	12.5
3. Length of blooming part (cm)	7.4	8.6	7.9	3.9	4.2	6.6	1.1
4. Days to flowering	90.4	65.2	71.2	45.0	68.0	183.6	16.6
5. Length of pod (cm)	5.9	6.0	5.9	5.4	6.1	5.7	1.7
6. No. of pods/branch	58.2	81.2	80.2	40.6	51.2	78.8	34.1
7. Pollen fertility (%)	98.9	91.4	81.2	98.6	98.6	98.4	6.0
8. Seed fertility (%)	84.5	58.6	56.2	92.5	93.3	94.1	5.3
9. Seed yield/plant (g)	10.4	22.1	20.0	17.5	21.4	18.6	7.1
10. Days to maturity	182.8	156.6	166.5	103.2	142.6	299.0	12.6
11. Per cent yield reduction due to aphid damage	18.5	11.7	15.5	19.4	55.4	9.8	7.1

Figures A & B Synthesized amphidiploid *B. napus* plants Bnt and Bnbs. In the middle a sterile hybrid plant before chromosome doubling.

ing part and pod number (figures A and B) compared well in pod length but showed lower values for pollen and seed fertility (table 1). In spite of this the seed yield was comparable with their parents. The synthetic *napus* genotypes were less prone to damage from aphid and alternaria, the major insect pest and disease of rape seed mustard in India. Some selections were made based on the number of branches, pod number, number of seeds per pod, seed fertility, seed yield, and earliness. Others which had some good attributes like compactness, high density of pods, large number of pods per inflorescence were also selected for use as further breeding material.

All the characters of synthetic *napus* showed a wide range of variation and offers good scope for selection. More hybridization work is in progress using diverse genotypes of parents and improved techniques of hybridization, to have a large number of synthetic *napus* types. This extensive synthesis coupled with suitable breeding procedures to recombine the yield contributing characters appears to offer possibilities to isolate desirable genotypes for developing a synthetic *B. napus* as an oilseed crop of India in the near future.

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