

IN SUPPORT OF THE SEPARATION OF
CASSIA TORA L. AND *C. OBTUSIFOLIA*
L. AS TWO DISTINCT TAXA

THE simultaneous publication of *Cassia tora* and *C. obtusifolia* by Linnaeus¹ as two distinct species was followed by the reduction of *C. obtusifolia* L. as a synonym of *C. tora* L. by Bentham.² Since then these two species have received confused treatment by taxonomists, being regarded by some as synonyms³⁻⁵ while by others as distinct species.⁶⁻⁹ During an ecological study of these species some experimental evidence has been gathered to indicate that these are distinct taxa and the same is briefly discussed in this communication. Details will be published elsewhere.

Seeds of both the species were obtained from three different localities, viz., Ahmedabad, Ujjain and Sagar in January, 1965 and plants were raised from these seed stocks in the botanical garden of the Banaras Hindu University under uniform culture conditions. When the plants were 30 days old data on their growth performance were recorded. For identification of the two species, characters described by Brenan⁹ were followed. Mature seeds of the two species were also stored for one year at different temperatures (-15° C. to 30° C.) and then the same were germinated at 30° C. which is the most suitable temperature for germination of these seeds¹⁰ to record the germination percentage.

It is apparent from Table I that values recorded for all the five characters in the case of *C. obtusifolia* are higher than the corresponding values for *C. tora*. The differences in the characters of the two species are statistically significant except for root penetration. This observation is contrary to that of Mall¹¹ who observed no difference in the height of the plants of these species in field. The response to uniform culture of plants of the two taxa from the same place is not uniform. For example, *C. obtusifolia* originating from

TABLE I
Growth performance of *C. tora* and *C. obtusifolia* under uniform culture

Character	<i>C. tora</i>			<i>C. obtusifolia</i>			Significance
	Ahmedabad	Sagar	Ujjain	Ahmedabad	Sagar	Ujjain	
Height (cm.)	11.20	11.12	14.10	20.48	20.74	20.38	***
Root penetration (cm.)	14.54	17.60	20.30	18.68	20.74	16.90	NS
Dry weight shoot (g.)	1.980	0.542	2.462	3.596	2.130	3.520	**
Dry weight root (g.)	0.096	0.092	0.078	0.148	0.154	0.166	***
Pod length (cm.)	10.10	11.20	9.60	10.60	14.10	13.40	***
No. seeds/pod.	15.73	17.80	14.30	15.70	21.03	22.20	***

NS=Not significant, ** $P < 0.01$, *** $P < 0.001$.

Sagar shows maximum height while in *C. tora* the tallest plants are those of Ujjain origin. From this experiment it is clear that *C. obtusifolia* is decidedly a more robust plant than *C. tora* and that their response to uniform culture is not similar. This type of behaviour is due to genetic difference in the populations as argued by Vaartaja¹² and McMillan.¹³

The records of germination percentage (Table II) indicate that germinability of *C. tora* is considerably lower than that of *C. obtusifolia*. Further, there is a consistent increase in the germination of *C. tora* with increasing storage temperature, the values for lower temperatures being very low. In *C. obtusifolia*, on the other hand, germinability is indifferent to storage temperature.

TABLE II

Percentage germination of seeds at 30° C. after one year storage at different temperatures (May-June, 1966)

Storage temperature	<i>C. tora</i>	<i>C. obtusifolia</i>
15° C. (for 3 months, later changed to 0° C.)	7.5	60
0° C.	8.5	54
10° C.	10.5	57
20° C.	19.5	63
30° C.	39.5	68

This experiment indicates that *C. obtusifolia* is more flexible to environmental conditions and thus supports the conclusion of Irwin and Turner.¹⁴ The wider distribution of *C. obtusifolia* both in New and Old World is probably due to this behaviour. Cumming^{15,16} found that the species which have more specific temperature requirement for germination are more restricted in distribution than those which have a wider amplitude. *C. tora* shows narrowing of optimal storage temperature and probably as a consequence is restricted to Old World.⁹

I conclude, therefore, that these two taxa are distinct and may represent two distinct species as argued by Mall.¹¹

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