

FLORAL ABNORMALITIES IN SUNFLOWER

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Malformation of the reproductive structures in sunflower with characteristic symptoms hitherto unknown were recorded for the first time in the breeders' seed nursery. Typically, the affected plants showed a normal and healthy vegetative growth throughout. The cultivar "Morden" was raised over an area of 0.2 hectare in the monsoon season on June 20, 1986 in vertisols and the crop was nurtured following the recommended practices. Abnormal development of floral buds was recorded in at least 30 plants during the reproductive phase. The buds tended to elongate into an oblong form with irregular margins. The back of the heads turned pale yellow to white in colour. Interestingly, the outer rim which is typically defined by the pistillate or ligulate ray florets (Heiser, 1976 and Hurd et al., 1980) did not develop, while the phyllaries or the involucre bracts were healthy and distinctly developed (Figure 1).

The green conical structures on the disc of the capitulum which develop into hermaphroditic and protrandrous disc florets (Frankel and Galun, 1971; Mc Gregor, 1976 and Knowles, 1978) were unusually malformed. Abnormally, these structures developed into dense, fleshy, thick and flattened masses of pale yellow to cream colour protuberances. The abnormality followed an acropetal succession in accordance with the general pattern of flowering. Approximately about one to two rings a day were malformed till the entire capitulum was covered in about 7-10 days (Figure 2). The affected sunflower heads resembled the curds of cauliflowers (right) as distinct from the development of achenes (left) in a normal head (Figure 3).

The morphological aberrations of the disc florets were scanned under a dissecting microscope (Stereo zoom x 10) and microphotographed (Figure 4). It was observed that the ovary was distorted and sterile while the corolla tube was transformed into a very much bulged, vase shaped ramified structure and was devoid of stamens (right). Typically, the normal disc floret comprised a distinct basal inferior ovary and the fused corolla tube that opens distally to accommodate the anther tube (left).

The abnormality reported does not conform to the symptoms of phyllody or witches broom (Nur, 1962), mycoplasmas (Zimmer and Hoes, 1978) or mutations (Knowles, 1978) reported earlier. Back crossing and selection process or induction of cytoplasmic male sterility has been reported to occasionally alter the floral colour and/or anatomy (Fick, 1978). Such abnormalities in sunflower contribute to non-random or restricted honey bee foraging and reduce the seed yield (Erickson, 1983). But, the abnormal symptoms noted by the authors in these studies showed no chance of pollination and consequently the seed set thus inflicting complete loss of seeds. An holistic approach by the scientists would furnish information on the cause of the malady noticed in future.



Figure 1. Abnormal development of the flower bud.



Figure 2. Abnormal development of the disc florets advancing from the periphery towards the centre.



Figure 3. Normal sunflower head with the development of achenes (left) and the abnormal sunflower head resembling the curd of a cauliflower (right).



Figure 4. Microscopic view of a normal (left) and affected (right) disc floret of sunflower.

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