# Seed pulp significantly inhibits seedling emergence in *Terminalia bellerica*

*Terminalia bellerica* Roxb. (Combretaceae, Belleric myrobalan/Baheda/Vibitaki) along with *Terminalia chebula* (Chebulic myrobalan/Harar/Haritaki) and *Emblica officinalis* (Emblic myrobalan/Amla/Amlaki) is an important ingredient of triphala[1]. Improving seed germination in *T. bellerica* is the key consideration, as seedlings establishment under natural condition is poor in this species[2,3]. Seeds of *T. bellerica*, collected in February 2011, were divided in two lots each containing 90 seeds. Pulp of seeds in first lot was not removed and it was removed from the other lot. After recording the weight of both the lots, seeds were sown immediately in triplicate (each replicate containing 30 seeds) in black colour polybags containing soil, farmyard manure (FYM) and sand (3 : 1 : 1 ratio) under nursery conditions at Mandal, Chamoli, Uttarakhand (1555 m amsl). During the experiment (April–September), average air temperature at this site was 20.30°C (min 10.78°C and max 31.06°C), and average humidity and rainfall were 80.06% (min 22.92% and max 99.95%), and 693.13 mm (min 262 mm and max 1999 mm respectively). The experiment was monitored daily for noting the number of days required for onset and subsequent emergence. Single factor-analysis of variance (ANOVA) was computed (MS Excel 2007). Data in percentage were transformed through ARCSINE analysis. Mean emergence time (MET) was calculated by modifying the following formula[4]

$$\text{MET} = \sum \frac{(fx)}{\sum x},$$

where $x$ is the number of newly emerged seedlings on each day, $f$ the number of days after the seedlings were set to emerge and $\sum x$ the total number of seedlings emerged at the end of the experiment.

Seeds with pulp emerged $13.33 \pm 5.77\%$, and those without pulp emerged $30.00 \pm 3.33\%$ with MET of $54.22 \pm 23.31$ and $43.75 \pm 2.11$ days respectively. Onset of emergence in the seeds without pulp was nearly 8 days earlier than seeds with pulp. The differences in emergence was significant at ($\text{LSD}^{\text{sin}}$ $P < 0.05 = 8.23$, $F = 16.50$). During experimentation it was noticed, that majority of the pulp-containing seeds were rotting, probably due to rotting of the pulp and invasion of microbes. Removal of seeds with pulp in *T. chebula* was found useful for improved seed germination[5]. On the other hand, thick moist litter layer under natural habitat was reported to be an inhibitor of seed germination in *T. oblonga*[6]. Similar may be the case with *T. bellerica*, where moist habitat promotes decay of pulped seeds; thus it may be a reason for less seedling emergence and poor seedling establishment in this genus. In *T. bellerica* seed pulp seems to inhibit emergence. Thus prior to seed sowing, removal of seed pulp in *T. bellerica* may be useful for enhanced seedling emergence, also it is an important ingredient of herbal medicines.


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# *Cephalosporium maydis* – a threat to maize in Telangana districts, Andhra Pradesh

Scattered maize (*Zea mays* L.) plants with symptoms of premature wilting were observed in many fields of Telangana districts, Andhra Pradesh during the rabi of 2008 and 2009 (Figure 1). In 2011, the affected fields showed as much as 60% incidences and symptoms affecting 50% of the hybrid varieties. Wilting became visible before tasseling and continued until shortly before maturity. It steadily progressed from the lower to the upper leaves; the leaf tissues between the veins changed first to a pale green colour, then the whole leaf rolled inward lengthwise. Some leaves dried up and became brittle. As leaf wilting advanced, yellowish or reddish-brown streaks appeared on the basal internodes of the stalk, which dried up and became shrunken. When the stalk was split, a brown discoloration extended along the internodes. The fungus that was consistently isolated from necrotic roots and basal tissues of the stalks of plants from many locations was identified as *Cephalosporium maydis.*

At the initial stages of crop growth, the plants were affected only due to *C. maydis.* Later, the susceptible plants hosted many other complex fungal organisms, such as *Sclerotium* spp., *Rhizoctonia* spp., etc. The fungus was isolated from both maize plants and the soil. The fungus generally was a soilborne pathogen, but in some cases, it could be isolated from seeds of killed plants, suggesting that it also may be seedborne. Inoculum survival is restricted to the top 20 cm of the soil and survival depends

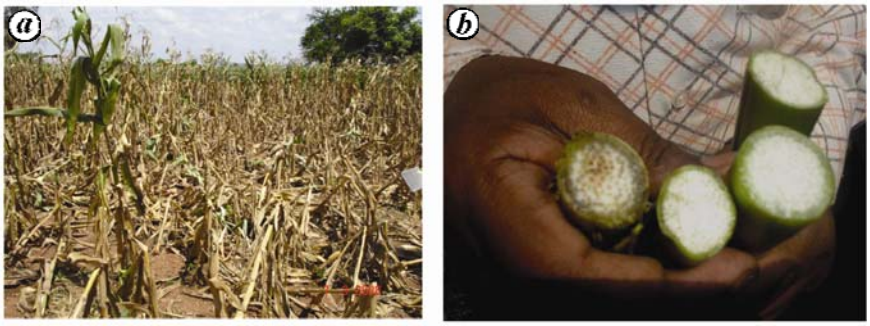

**Figure 1.** ***a***, Maize plants affected with wilt at Cherlabuthkur, Karimnagar district, Andhra Pradesh. ***b***, Symptoms of late wilt in maize.

primarily on the persistence in infected crop residues.

Previously it was reported that widespread use of no-till corn systems and the unknown impact of extensive glyphosate application increased the severity of several related Gaeumannomyces-Harpophora-type diseases, which could eventually result in inoculum build-up in the soil or increased virulence of the pathogen[1]. Moisture management and flood-fallowing may be useful cultural controls for late wilt where they are economically practical[2]. A physiological sufficiency of potassium is also reported to reduce late wilt in low-K fields of India, but not in the higher K soils of Egypt. Phosphorus, organic amendments (straw, cotton cakes and brodret) and micronutrients (Cu, Fe, Mn and Zn) also reduce disease severity[3]. The extensive use of glyphosate in the no-till corn production in USA, which can immobilize Mn in the soil and restrict plant uptake and transport of Cu, Fe, Mn, Zn and other essential micronutrients, may have a serious predisposing effect on this disease through reduced plant resistance or increased pathogen virulence[4].

The geographic distribution of this fungus may be expanding, or its recognition may be increasing. Further there is great need for research in this area to evolve suitable management strategies.

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# Is there hope for our own tetracorn?

In a popular article in *Aaple Paryavaran* (Marathi magazine published from Thane), we had used the phrase 'mistaken identity' to highlight the confusion reigning over the identity of the four-horned antelope (FHA) and barking deer (BD) in the southwestern parts of Maharashtra. The confusion emanates from the blatant use of the Marathi name 'bhekar' for these two very different species – by common man and Forest Department officials alike. Recently, the phrase almost acquired its meaning from the lexicon of criminal law when a FHA was mistakenly identified as a BD by Forest Department officials. The animal, unfortunately, was dead and was seized from a troop of poachers in Satara district, Maharashtra. In the initial procedures the animal was described as bhekar implying – in the usual sense of the Marathi name – that the killed animal was a BD. Only after a curious second thought by the concerned forest officer and a hopeful conjecture by the first author, the animal was correctly identified as a FHA from its photographs.

We have been consistently rallying for the past few years with the local Forest Department to clear the air about these two animals and use two distinct Marathi names for them at least in their records. We have showed them evidence of FHA presence, distinct signs ascertaining its presence; got the information published[1] and distributed. But the change, obviously, takes time. This is especially important


**Figure 1.** Camera trap photo of four-horned antelope from Dapoli. This adult has just the posterior pair of horns.