genotypes can prove useful in economising hybrid seed production in tomato. Further studies on the suitability of Ex-1 and Ex-3 as general combiners and as female parents in hybrid seed production are in progress.

The encouragement given by our Director Dr. G. S. Randhawa and the valuable suggestions offered by Dr. R. Krishnan, Head, Division of Medicinal and Aromatic Plants, during this study are gratefully acknowledged.

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**ISOLATION OF **CORYNEBACTERIUM **PSEUDOTUBERCULOSIS FROM TWO ABORTED EQUINE FOETUSES**

Corynebacterium pseudotuberculosis has been well established as the cause of caseous lymphadenitis in sheep and ulcerative lymphangitis in horses. In recent years, a second form of the disease, *viz.*, abscess formation in pectoral, lower abdominal and inguinal regions in the equines has been associated with this organism with increasing frequency. Although generalised infection, in the equines, with *C. pseudotuberculosis* has rarely been recorded, its association as a specific cause of abortion in the mare has not been reported. This report documents the association of *C. pseudotuberculosis* with abortion in mares.

Two foetuses, aborted between 140 and 160 days of gestation were examined for bacterial infection. The mares were reported to be otherwise normal. No abnormality of the placenta was noticed. The heart blood and stomach contents of the two foetuses were collected aseptically and inoculated on blood agar plates (7% ox blood). Incubation was done at 37°C under 10% carbon dioxide tension in an anaerobic for 48 h before examination.

The heart blood and the stomach contents of both the foetuses yielded smooth, circular and rounded colonies. A narrow zone of beta haemolysis was observed around the colonies. The isolates from the two foetuses were identified as *Corynebacterium pseudotuberculosis*. Pathogenicity tests were conducted in adult albino mice using 18 h broth cultures of the two isolates by the intraperitoneal route. One mouse died in 5 days and the other in 7 days after inoculation.

![Image](https://example.com/image1.png)

**Fig. 1.** Comparative leaf shape stigma exertion and flower disposition in **Ex - 1** (*c, ex, ps*), **Ex - 3** (*c, ex, ps*) and normal (*c*, *ps*) genotypes.
C. pseudotuberculosis was isolated from the stomach contents and heart blood of one mouse and the stomach contents only in the other. Toxin production was then attempted. The toxin thus produced from each strain was separately inoculated in 0.1 ml volume intravenously into 2 mice which did not die in 10 days.

The colonial characters of the two isolates, as mentioned earlier, were suggestive of the organisms being variants of C. pseudotuberculosis. The negative reaction on nitrate shown by the isolates indicated these to be ovine strains of the organisms. C. pseudotuberculosis is known to cause infection in sheep and horses. However, its primary role in causing abortion in the mare has not been observed. The two isolates appear to be non-toxigenic ovine strains of C. pseudotuberculosis. The role of such strains in equine disease is not well understood.

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INDUCTION OF RHIZOGENESIS BY CAFFEIC ACID IN MAIZE STEM SEGMENTS

Although the physiological effects of naturally occurring phenolic acids are well documented, their mechanism of action is not understood. It has been suggested that phenolic acids affect plant processes by regulating the transport and metabolism of auxins. Consistent with this suggestion, Basu et al. observed significant stimulation of indole acetic acid (IAA) synthesis by caffeic acid in Phaseolus vulgaris (french bean), P. aureus (mung bean) and Ipomoea carnea. Caffeic acid acted synergistically with the IAA in the growth of Avena coleoptile. To examine whether the caffeic acid mimics some other known effects of IAA in maize segments, the present investigation was undertaken.

Experimental

Seeds of Zea mays L. cv. Ganga safed−2 were surface sterilised with 0.1% HgCl₂ for about two minutes, washed with water and then planted on moist filter-papers. The seedlings were raised for 5 days in dark at 25 ± 2°C. The coleoptile and stem segments (mesocotyl) were exercised aseptically from uniformly grown seedlings and were floated on the desired concentration of caffeic acid at 25°C in light. To prevent bacterial contamination, about 2-3 drops of chloramphenicol (1 mg/ml) were added. Further, for experiments with rhizogenesis, the solutions were changed every 24 hr. The pH in each case was 6.0 and about 6 to 10 stem segments were floated in each treatment. Ethanol-soluble and proteinous nitrogen in the coleoptile segments were determined according to an earlier procedure.

Results and Discussion

As shown in Table I, caffeic acid in a concentration range of 1 to 500 μM enhanced (statistically significant) rooting in maize stem segments. However, higher concentration (1000 μM) had no effect. In the traditional materials used for rooting studies such as beans, caffeic acid synergizes with IAA and tryptophan in inducing rhizogenesis, although it has no effect in Ipomoea.

**Table I**

<table>
<thead>
<tr>
<th>Concentration of Segments</th>
<th>Average increase in fresh weight %</th>
<th>Increase in length of roots per segment %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16.6</td>
<td>2.5</td>
</tr>
<tr>
<td>1</td>
<td>58.5</td>
<td>5.0</td>
</tr>
<tr>
<td>20</td>
<td>66.6</td>
<td>4.8</td>
</tr>
<tr>
<td>100</td>
<td>66.6</td>
<td>3.6</td>
</tr>
<tr>
<td>500</td>
<td>50.0</td>
<td>4.5</td>
</tr>
<tr>
<td>1000</td>
<td>16.6</td>
<td>2.5</td>
</tr>
</tbody>
</table>

In another experiment, the length of maize coleoptile was significantly enhanced by caffeic acid, although the fresh weight was less enhanced (Table I). Further, the short term responses of increase in fresh weight,