A NEW PARENTAL LINE 'F95181' FOR BREEDING OF ANTHOCYANIN-RICH TEA

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Summary

Anthocyanin-rich crops have attracted attention in recent years because of their health benefits, and anthocyanin-rich tea is one of these crops. 'F95181' (Camellia sinensis) was developed for breeding anthocyanin-rich tea cultivars and registered as a new parental line 'Cha Chuukanbohon Nou 6' (C. sinensis) in 2004. 'F95181' was selected from an interspecific cross between C. taliensis (a wild relative of tea) and 'Okumusashi' (C. sinensis). The physiological and ecological characteristics of 'F95181' are superior to the anthocyanin-rich tea, Benibana-cha. Although the anthocyanin level of 'F95181' is the same as that of Benibana-cha, it appears that the anthocyanins of 'F95181' are more stable. In addition, the crossing 'F95181' with other tea cultivars often produces progenies that contain anthocyanin at levels greater than 1%, which is much greater than that of other tea strains. Therefore, 'F95181' is expected to be a useful material for breeding an anthocyanin-rich tea cultivars.

Keywords

tea, anthocyanin, Camellia taliensis, wild relatives, interspecific cross

Introduction

Anthocyanins are botanical pigments that range in color from red to purple. People have used anthocyanin-rich crops as natural food colorants since early times. As the health benefits of anthocyanin have been gradually recognized, consumers are regarding anthocyanin-rich crops as healthy foods.

Although a few tea cultivars contain high levels of anthocyanin, traditionally they had been culled out because their color is deemed bad for green tea and the plants are weak. These cultivars are now commanding attention, however, as new anthocyanin-rich crop. Because these tea cultivars produce another functional component, Catechins, and their anthocyanin composition itself is differ from other anthocyanin-rich crops.

In the present study, we describe a new parental line 'F95181' for breeding of anthocyanin-rich tea. The breeding process and characteristics are described.

Breeding process of 'F95181'

'F95181' was derived from the interspecific cross between C. taliensis, the wild relative of tea, and 'Okumusashi'. Seed production and sowing took place in 1994.
'F95181' was cultivated in a field from 1995 to 1999, and specific characteristic and crossing tests were done from 2000 to 2003. On the basis of these results, 'F95181' was deemed to be a useful parental line and registered under the name 'Cha Chuukanbohon Nou 6' in 2004.

Characteristics of 'F95181'

An overview of characteristics of 'F95181' is shown in Table 1. The tree shape of 'F95181' is slightly erect, and the growth is more vigorous than that of the existing anthocyanin-rich tea, Benibana-cha (red flower tea). The time of sprouting, and thus plucking, is early. 'F95181' also has mid-range resistance to cold in mid-winter, and it is resistant to tea anthracnose (Colletotrichum theae-sinensis) and tea gray blight (Pestalotiopsis longista).

'F95181' contains high levels of anthocyanins, equal to those of Benibana-cha. According to HPLC results, 10 major anthocyanins are produced by 'F95181', whereas Benibana-cha has only five (Fig.1). Peak 10 and 11 in the figure represent anthocyanins that are acylated, a state related to anthocyanin stability. Thus, the anthocyanins of 'F95181' are apparently more stable than those of Benibana-cha because of its greater number of acylated anthocyanins.

'F95181' has proved to be a sufficient parental line, producing many progeny with higher anthocyanin content. In the crosses of 'F95181' and Benibana-cha, 21% of the progenies have higher anthocyanin content than that of parents.

Table 1  The overview of characteristics of 'F95181'

<table>
<thead>
<tr>
<th>Shape of plant</th>
<th>Tree Vigor</th>
<th>Time of sprout and pluck</th>
<th>Cold resistance</th>
<th>Tea anthracnose resistance</th>
<th>Tea gray blight resistance</th>
<th>Anthocyanin content</th>
</tr>
</thead>
<tbody>
<tr>
<td>F95181</td>
<td>Slightly erect</td>
<td>Vigorous</td>
<td>Early</td>
<td>Middle</td>
<td>Resistant</td>
<td>Resistant</td>
</tr>
<tr>
<td>Benibana-cha*</td>
<td>Slightly spread</td>
<td>Extremely weak</td>
<td>Slightly late</td>
<td>Resistant</td>
<td>Resistant</td>
<td>0.34%</td>
</tr>
<tr>
<td>Yabukita</td>
<td>Erect</td>
<td>Middle</td>
<td>Middle</td>
<td>Resistant</td>
<td>Susceptible</td>
<td>0.01-0.03%</td>
</tr>
</tbody>
</table>

* Existing anthocyanin-rich tea

![Fig 1 HPLC analysis anthocyanin contents of 'F95181' and Benibana-cha](image)