Diagnostic characteristics of fieldpea varieties

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Abstract
Fifteen promising varieties (DDR 23, DDR 27, DDR 44, HUDP 4, HUDP 15, HUP 2, IM 9101, IM 9102, JM 6, JP 885, KPP 103, KPMR 400, KPMR 522, Rachna and Sapna) of fieldpea were studied for their various attributes relating to the distinctness, uniformity and stability test National guidelines. The varieties of fieldpea following its National guidelines. The varieties were distinguished by more precisely definable and discernable morphological characteristics namely, stem anthocyanin coloration, foliage color, leaf/ leaflets type, rabbit eared stipule, stipule type, leaf juncture colour, flowering time, plant type, flower colour, number of pods/axil, pod shape, pod beak, seed shape, cotyledon colour, seed size and test mottling. These characters expressed uniformity and stability over years. Therefore, present character profile can be used as reference for seed industries, certification agencies, seed testing labs, researchers, etc, and also in preparation of final draft/ data base of this crop varieties in context to the Protection of Plant Varieties and Farmer’s Rights and globalization of WTO regimes.

Keywords: Diagnostic characteristics, fieldpea

Introduction
Globally, field pea (Pisum sativum L., 2n=14) is the third most important pulse crop after dry bean and chickpea, and third most popular rabi pulse of India after chickpea and lentil. India rank fourth position in area by growing it over 10.6 lakh ha and 5th position in production after producing about 10.10 lakh tonnes during 2017-18 (Anon., 2018). Uttar Pradesh is the major field pea growing state. It alone contributes about 49% of total production in India. Besides, Madhya Pradesh, Bihar and Maharashtra are the major pea producing states. Field pea is used primarily as whole or split into dal and also in various ways for human consumption or livestock feed as green fodder and straw also as cover crop to prevent soil erosion. Field pea has high levels of the amino acids, lysine and tryptophan, which is relatively low in cereal grains. It contains approximately 21 to 25% protein, 1.8% fat, 62.1% carbohydrate, 64 mg/100g calcium and 4.8 mg/100g iron, and 86 to 87 per cent total digestible nutrients which makes them an excellent livestock feed. It has also shown that field pea is an excellent protein supplement in swine, beef cow and feed to dairy and poultry rations (Endres et al., 2016) [3]. Field pea is a legume crop and has the inherent ability to obtain much of its nitrogen requirement from the atmosphere by forming a symbiotic relationship with Rhizobium bacteria in the soil. It is among the most highly efficient nitrogen-fixing crops and may obtain as much as 80 per cent of its total nitrogen requirement from fixation under good growing conditions (Endres et al., 2016) [3]. There had been a wide range of variability for morpho-agronomic traits including protein patterns and molecular markers (Mishra et al.,1998; Renu and Mishra, 2003) [5, 6] as well as its phylogenetical analysis based on morphological characters, allozyme and RAPD markers (Honey et al., 1996) [4]. However, the knowledge about their attributes relating to the Distinctness, Uniformity and Stability (DUS) test which generates official description of a variety to be used for assessing Varietal purity (in crop inspection & grow out test), to identify one to more precisely definable and discernable phenotypic character(s) having least environmental influence for certification purpose and to match this character profile with that submitted by the applicant for the purpose of deciding to grant or not grant the registration of a new variety, is meagre. Keeping these and globalization of WTO regimes and the scenario of Intellectual Property Rights (IPR) in views, the present investigation was undertaken to assess the distinctness, uniformity and stability of promising varieties in the fieldpea.
Materials and Methods
Healthy and uniform seeds of fifteen promising varieties (Table 1) of fieldpea obtained from Indian Institute of Pulses Research, Kanpur were studied for their various attributes pertaining to the distinctness, uniformity and stability test at Crop Research Station, Masodha. Each test material was sown in 6 rows at 5 meter length adopting a row spacing of 60 cm for dwarf and 90 cm for tall varieties and 10 cm between the plants in a randomized block design with 3 replications. Recommended packages of practices were followed to raise an ideal crop. The diagnostic characteristics of varieties studied as per its national test guidelines (Anon., 2001) and the mean of both years for the characters, where required, were obtained and designed the character profile accordingly.

Table 1: Diagnostic characteristics of some promising varieties of fieldpea.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>DDR23</th>
<th>DDR27</th>
<th>DDR44</th>
<th>HPP4</th>
<th>HUP15</th>
<th>HUP2</th>
<th>IM9101</th>
<th>JM9102</th>
<th>JM36</th>
<th>JP885</th>
<th>KPP103</th>
<th>KPMR400</th>
<th>KPMR522</th>
<th>Rachna</th>
<th>Sapna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant height</td>
<td>Dwarf</td>
<td>Dwarf</td>
<td>Dwarf</td>
<td>Slightly taller</td>
<td>Dwarf</td>
<td>Tall</td>
<td>Tall</td>
<td>Tall</td>
<td>Tall</td>
<td>Dwarf</td>
<td>Dwarf</td>
<td>Tall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of podsaxil</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Mostly double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td>Double</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Podd break</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Pointed</td>
<td>Blunt</td>
<td>Pointed</td>
<td>Pointed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pod colour</td>
<td>Light green</td>
<td>Light green</td>
<td>Green</td>
<td>Green</td>
<td>Light green</td>
<td>Light green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotyledon colour</td>
<td>Yellow</td>
<td>Green</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed size</td>
<td>Medium</td>
<td>Bold</td>
<td>Bold</td>
<td>Medium</td>
<td>Bold</td>
<td>Bold</td>
<td>Medium</td>
<td>Bold</td>
<td>Bold</td>
<td>Medium</td>
<td>Bold</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results and Discussion
The character profile with respect to each variety under studied is presented in table 1. It could be seen from the table that these varieties could clearly be distinguished either by one or more characters such as foliage colour, leaf/ leaflets, rabbit ear stipule, flowering type, plants type, pod beak, pod colour and seed size. Some other characters namely, stem anthocyanin coloration, stipule type, leaf juncture colour, flower colour, number of pods/ axil and testa motting were not easily discriminate among the varieties under studied. These were mainly due to their narrow genetic base. Similar type of findings have also being reported during characterization of germplasm on the basis of molecular markers (Renu and Mishra, 2003) [6]. Further, these characters showed uniformity in their expression and stable over the years. These findings could easily be utilized by seed industries, certification agencies, seed testing lab., researchers, etc. Furthermore, these are being contributed in preparation of final draft/data base of this crop varieties in our country which could ever be utilized as and when required in the context to an cat on protection of plant varieties and farmer’s Rights (PFV&FR).

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Reference