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Characterization of indigenous and exotic chickpea lines for qualitative traits

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Abstract

Cultivated chickpea is one of the important pulse crops of India. Emphasis on characterization, identification and genetic purity assessment of chickpea genotypes is important for its effective utilization. Understandings of morphological and seed traits facilitate the identification, selection of desirable traits, designing new populations and transferring their desirable genes. Ninety five indigenous and exotic lines of chickpea including *desi* and *kabuli* types were evaluated for twelve qualitative traits. Large variations were observed for qualitative traits *viz.*, plant growth habit, foliage color and seed traits. Genotypes were grouped into different categories based on DUS test guidelines for their identification through descriptors. However systematic characterization leads to a more efficient use of material under consideration in chickpea improvement programme.

Keywords: Chickpea, DUS, varietal identification, characterization, genotypes

Introduction

Chickpea (*Cicer arietinum* L.) commonly known as Bengal gram or garbanzo bean, is one of the oldest and widely cultivated pulse crops over 50 countries of the world. It is a highly self-pollinating (Auckland and van der Maesen 1980) [3] annual grain legume and a member of the family Leguminosae, sub-family Papilionaceae, tribe *Vicieae* and genus *cicer*. Most probably originated in Southeastern Turkey adjoining Syria (Ladizinsky, 1975) [10] and subsequently spread to India and Europe (Singh and Auckland, 1976) [2]. It is generally grown across a wide temperature regime ranging from <5 °C in sub-tropics to >30 °C in the arid tropics with annual rainfall of 600-1000 mm. Emphasis on characterization, identification and genetic purity assessment of chickpea genotypes is important to the effective utilization. Therefore, for keeping the purity of genotypes, stable visual diagnostic characters of seed and plant morphology are utmost essential to know (Lalitha, 2007) [11]. The requirement of distinctness, uniformity and stability are assessed on the basis of characteristics. Describing the characteristics of a crop species based on standard descriptors is effective for better utilization and conservation of germplasm (Diederichsen and Richards, 2003). Look to the above facts based on chickpea descriptors study was undertaken for classification of ninety five indigenous and exotic lines of chickpea.

Materials and Methods

The study was conducted on the site of seed breeding farm, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur during *rabi* of 2017-18. The experimental material comprised of 95 indigenous and exotic lines were obtained from JNKVV Jabalpur, IIPR, Kanpur, ICARISAT, Pattancheru and ICARDA, Morocco. Different genotypes were evaluated in three replications using Randomized Complete Block Design (RCBD) with each entry in two rows of 4.0 m length in each replication. Inter and intra-row space was 30×10cm, for *desi* type and 45×10 for *kabuli* type respectively. The recommended agronomical and plant protection practices were followed for the successful raising of the crop. Observations were recorded on 12 qualitative traits including morphological and seed traits based on the DUS guide line of chickpea for each character in each replication at different crop growth stages. Qualitative traits along with its descriptors and stage of observation have been depicted in Table 1.

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Table 1: List of Qualitative Traits with Descriptors

S. No.	Characteristics	Descriptors	Stage of observation
1	Stem: Anthocyanin coloration	Absent, Present	Before flowering
2	Plant :Growth habit	Erect, Semi-erect, Semi Spreading, Spreading	50% flowering
3	Color of foliage	Light green, Medium green, Dark green, Greenish purple	50% flowering
4	Leaflet :Size	Small, Medium, Large	50% flowering
5	Leaf: Pattern	Simple, Compound, Pinnate	50% flowering
6	Flower :Color	White, Pink, Blue, Purple	50% flowering
7	Peduncle: Length (mm)	Short, Medium, Long	Pod development
8	Seed :Color	Beige (kabuli), Creamy beige, Green, Yellow, Orange, Brown, Dark brown, Grey, Black	30 days after harvest
9	Seed : Size	Very small, Small, Medium, Large, Very large	30 days after harvest
10	Seed: Shape	Pea-shaped, Owl's head, Angular	30 days after harvest
11	Seed: Testa texture	Rough, Smooth, Tuberculated	30 days after harvest
12	Seed :Ribbing	Absent, Present	30 days after harvest

Results and Discussion

Morphological characterization is the first step in the description and classification of the material under study. The requirement of distinctness, uniformity and stability are assessed on the basis of characteristics. Understandings of morphological characters facilitate the identification, selection of desirable traits, designing new populations and transferring their desirable genes. Describing the characteristics of a crop species based on standard descriptors is effective for better utilization and conservation of germplasm (Diederichsen and Richards, 2003). Look to the above facts study was undertaken for classification of 95 chickpea lines based on chickpea descriptors. Large variation noted in qualitative traits, it was attempted to group the chickpea genotypes and identify them through descriptors (Table 2). Based on morphological variation, the 95 genotypes (45 Desi & 50 Kabuli) could be differentiating from each other.

Anthocyanin pigmentation, dark coloration on stem, whole plant and pods; 26 *desi* indigenous lines showing anthocyanin pigmentation and the remaining 69 exotic lines including *desi* and *kabuli* absence of anthocyanin pigmentation. No variation was found among the genotypes for Leaf pattern and all genotypes had pinnate type of leaf pattern.

Plant growth habit is a distinguishing feature in plant characterization. Large variation observed in growth habit 44 lines were semi spreading, 36 lines were semi-erect, while 15 lines were spreading type. Erect growth habit was not found in any line under study.

Wide intensity showed in foliage color, 60 lines showed dark green color foliage, 28 lines were medium green foliage, while 7 lines showed light green color of foliage. This is a visual trait easily observable in vegetative stage of plant. With regard to size of leaflets, the variation was observed and the genotypes were categorized into three main groups *viz*; small, medium and large. Thirty genotypes recorded small size leaflets (10.0mm), 48 genotypes recorded medium (10.0-15.0mm), while the remaining 17 genotypes were large (>15.0mm) leaflets size.

Color of flower is one of the most important diagnostic visual easily observable traits. It is widely used as a marker gene in genetic studies and breeding work. 50 exotic lines of *kabuli* and one line of *desi* chickpea (RVSSG 60) showed white color flower, while 35 lines were pink flower, whereas remaining 9 *desi* indigenous lines showed blue color of flowers. The study of pod peduncle length is a peculiar trait for characterization, chickpea genotypes can be classified in to three categories. The 8 genotypes exhibited short peduncle, while 49 genotypes recorded medium peduncle length and the remaining 38 genotypes showed long peduncle.

Seed size and color are most preferred traits by consumer. Large variation found in seed size and seed coat color, genotypes were categorized into ten groups *viz.*, brown, dark brown, reddish brown, beige (kabuli with pure white), black, creamy beige, green, orange, yellow and grey in color. Out of 95 genotypes 22 genotypes showed brown seed coat color, 12 genotypes showed dark brown color, while 11 genotypes showed yellow seed coat color in the *desi* chickpea, while in the Kabuli chickpea all genotypes showed beige color.

Seed size is an important marketing trait was categorized into four groups *viz.*, small, medium, large and extra-large seed size (weight of 100 seed). Very small seed size (<20g) was recorded in 7 genotypes, small seed size (20-25g) in 19 genotypes, medium seed size (26-35g) in 20 genotypes, large seed size (36-45g) was recorded in 33 genotypes, whereas extra-large seed size in 16 genotypes. In chickpea two categories in seed shape is pre dominant, angular shape (ram head) and owl's head (irregular shape). All 45 *desi* chickpea lines were angular shape and 50 kabuli lines were owl's head shape.

Based on seed testa texture three group categorized in chickpea *viz*; rough, smooth and tuberculated. In this study two seed textures were exhibited rough texture in 45 genotypes of *desi* type and smooth texture in 50 genotypes of kabuli type. Seed ribbing was present in 57 genotypes and absent in 38 genotypes. These results are in agreement with the findings of Upadhyaya (2003), Kaul *et al.* (2007) [4], Upadhaya *et al.* (2007) [16], Upadhaya *et al.* (2008) [17], Sarao *et al.* (2009) [13], Araujo and Vello (2010) [1], Keneni *et al.* (2011) [9] Shrivastava *et al.* (2012) [14] and Bayahi *et al.* (2015) [4].

These visual traits showed overlapping of expression in various combinations, yet proved to be of great utility as identity of all the genotypes could be established individually. Considering sixteen qualitative traits 45 *desi* genotypes were characterized by small to medium seed, angular shaped seeds of various colors (light brown, dark brown and yellow colors) having rough/smooth seed coat texture with pinkish or bluish flowers, small plant stature, small leaflets, presence of anthocyanin pigmentation and usually 2-3 seeds per pod. Fifty genotypes were kabuli type have irregular or large owl's head shape, beige color seed coat, larger seed with smooth seed coat, long plant stature, white flowers, bigger leaflets, no anthocyanin and usually one or two seeds per pod. There is no basic difference in chromosome number (2n=16) of *desi* and *kabuli* and both types cross easily with each other and belongs to cultivated chickpea species *Cicer arietinum* L.

Morphological features of genotypes have been a major component of varietal identification (Gediya *et al.*, 2018) [6].

It is not possible to identify advanced promising lines using any single parameter. A detailed morphological description of plants and seeds should therefore be prepared. Utilization of these features in sequential fashion is useful and convenient to distinguish different genotypes. Similarly, genotypes identification based on distinguishable morphological

characters were reported by Lalitha (2007)^[11], Upadhyaya *et al.* (2002)^[15], Yadav and Shrivastava (2002)^[14], Chowdhury *et al.* (2002)^[5] and Singh (2001)^[12] in chickpea, However systematic characterization leads to a more efficient use of material under consideration in chickpea improvement programme.

Table 2: Distinguishable qualitative traits of chickpea genotypes

S. N.	Genotype	Anthocyanin pigmentation	Leaf Pattern	Growth habit	Color of foliage	Leaflet size	Flower color	Peduncle length	Seed color	Seed size	Seed shape	Seed testa texture	Seed ribbing
1	Phule G 1018-9-6	Present	Pinnate	Semi Spreading	Dark green	small	Pink	Medium	Yellow	Medium	Angular shape	Rough	Present
2	GNG 2369	Present	Pinnate	Semi erect	Medium green	small	Pink	Long	Brown	Small	Angular shape	Rough	Present
3	BG 3091	Present	Pinnate	Semi Spreading	Dark green	medium	Blue	Long	Dark brown	Small	Angular shape	Rough	Absent
4	PG 187	Present	Pinnate	Spreading	Dark green	medium	Pink	Medium	Brown	Medium	Angular shape	Rough	Present
5	BRC 305	Present	Pinnate	Semi Spreading	Medium green	medium	Pink	Medium	Dark brown	Medium	Angular shape	Rough	Present
6	JSC 55 (RVG 202)	Present	Pinnate	Semi Spreading	Dark green	small	Pink	Long	Brown	Medium	Angular shape	Rough	Present
7	H 12-22	Present	Pinnate	Spreading	Light green	medium	Blue	Medium	Brown	Small	Angular shape	Rough	Present
8	RG 2011-04	Present	Pinnate	Semi Spreading	Dark green	small	Pink	Long	Yellow	Very small	Angular shape	Rough	Absent
9	RG 12-205	Absent	Pinnate	Semi Spreading	Dark green	small	Pink	Long	Brown	Medium	Angular shape	Rough	Absent
10	RKG 13-205	Present	Pinnate	Semi Spreading	Medium green	small	Pink	Medium	Brown	Small	Angular shape	Rough	Present
11	JG 2017-50	Present	Pinnate	Semi erect	Medium green	medium	Pink	Medium	Brown	Very small	Angular shape	Rough	Present
12	CSJ 887	Absent	Pinnate	Semi Spreading	Medium green	medium	Blue	Medium	Dark brown	Small	Angular shape	Rough	Absent
13	IPC 2010-14	Absent	Pinnate	Semi Spreading	Light green	medium	Blue	Medium	Brown	Very small	Angular shape	Rough	Present
14	GNG 2367	Present	Pinnate	Semi erect	Dark green	small	Pink	Long	Yellow	Small	Angular shape	Rough	Present
15	JG 2017-49	Present	Pinnate	Semi erect	Light green	small	Blue	Medium	Yellow	Medium	Angular shape	Rough	Present
16	RKG17-01	Present	Pinnate	Semi spreading	Dark green	small	Pink	Medium	Yellow	Medium	Angular shape	Rough	Present
17	BRC 302	Absent	Pinnate	Semi erect	Dark green	small	Pink	Medium	Yellow	Medium	Angular shape	Rough	Absent
18	JSC 56 (RVG 203)	Absent	Pinnate	Semi erect	Dark green	medium	Pink	Long	Brown	Medium	Angular shape	Rough	Absent
19	GJG 1503	Absent	Pinnate	Semi spreading	Dark green	medium	Pink	Medium	Brown	Small	Angular shape	Rough	Present
20	RVSSG 60	Absent	Pinnate	Semi spreading	Medium green	medium	White	Medium	Yellow	Small	Angular shape	Rough	Absent
21	NDG 15-5	Absent	Pinnate	Semi spreading	Light green	small	Pink	Medium	Dark brown	medium	Angular shape	Rough	Present
22	BG 372	Present	Pinnate	Spreading	Dark green	medium	Pink	Medium	Brown	Medium	Angular shape	Rough	Present
23	DC 16-116	Absent	Pinnate	Spreading	Dark green	small	Pink	Medium	Dark brown	Medium	Angular shape	Rough	Present
24	PG 205	Present	Pinnate	Semi spreading	Dark green	small	Pink	Long	Dark brown	Small	Angular shape	Rough	Present
25	GL 14015	Present	Pinnate	Semi spreading	Dark green	medium	Blue	Long	Brown	Very small	Angular shape	Rough	Absent
26	CSJ 956	Absent	Pinnate	Semi spreading	Dark green	small	Pink	Long	Yellow	Small	Angular shape	Rough	Absent
27	RG 2015-05	Absent	Pinnate	Semi erect	Dark green	medium	Pink	Medium	Dark brown	Small	Angular shape	Rough	Present
28	Phule G 1012-10-9	Present	Pinnate	Semi spreading	Dark green	small	Pink	Medium	Brown	Small	Angular shape	Rough	Absent
29	BG 3092	Present	Pinnate	Semi erect	dark green	medium	Pink	Medium	Yellow	Very small	Angular shape	Rough	Present
30	BG 372	Present	Pinnate	Semi erect	Dark green	medium	Blue	Medium	Brown	Small	Angular shape	Rough	Present
31	RKG 13-515-1	Present	Pinnate	Semi erect	Medium green	small	Pink	Long	Brown	Small	Angular shape	Rough	Present
32	JSC 56 (RVG 203)	Absent	Pinnate	Semi spreading	Medium green	Large	Pink	Medium	Yellow	Medium	Angular shape	Rough	Absent
33	JSC 55 (RVG 202)	Absent	Pinnate	Semi erect	Dark green	Small	Pink	Medium	Dark brown	Medium	Angular shape	Rough	Present
34	JG 11 X JG 14	Absent	Pinnate	Semi erect	Dark green	Medium	Pink	Medium	Dark	Very	Angular	Rough	Present

									brown	small	shape		
35	ICC96029 X ICC11551	Absent	Pinnate	Semi spreading	Medium green	Medium	Pink	Medium	Brown	Small	Angular shape	Rough	Absent
36	JG 2016-1614	Present	Pinnate	Semi spreading	Dark green	Medium	Blue	Medium	Dark brown	Medium	Angular shape	Rough	Present
37	JG63 X ICC4958	Present	Pinnate	Semi spreading	Dark green	Medium	Pink	Medium	Brown	Small	Angular shape	Rough	Present
38	JG12 X JG 16- 3	Present	Pinnate	Semi erect	Dark green	Small	Pink	Medium	Brown	Small	Angular shape	Rough	Present
39	JG12 X JG16-1	Present	Pinnate	Semi spreading	Dark green	Small	Pink	Medium	Dark brown	Medium	Angular shape	Rough	Present
40	JG74 X ICCV4958	Absent	Pinnate	Semi erect	Dark green	Small	Pink	Long	Brown	Medium	Angular shape	Rough	Present
41	ICC96029 X JG315	Absent	Pinnate	Semi erect	Dark green	Small	Pink	Medium	Yellow	medium	Angular shape	Rough	Present
42	ICCV15118	Absent	Pinnate	Spreading	Dark green	Medium	Blue	Long	Dark brown	medium	Angular shape	Rough	Present
43	JG 12	Present	Pinnate	Semi spreading	Dark green	Small	Pink	Medium	Brown	Medium	Angular shape	Rough	Absent
44	JG 14	Absent	Pinnate	Semi erect	Dark green	Medium	Pink	Medium	Brown	Small	Angular shape	Rough	Present
45	JG 36	Present	Pinnate	Semi spreading	Dark green	Medium	Pink	Medium	Brown	Small	Angular shape	Rough	Present
46	ICCV 14308	Absent	Pinnate	Semi spreading	Dark green	Large	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
47	ICCV 14501	Absent	Pinnate	Semi spreading	dark green	Large	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
48	ICCV 14511	Absent	Pinnate	Semi erect	Medium green	medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
49	ICCV 14509	Absent	Pinnate	Semi erect	Dark green	medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
50	ICCV 14508	Absent	Pinnate	Semi erect	Medium green	Large	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
51	ICCV 14313	Absent	Pinnate	Semi erect	Dark green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
52	ICCV 14314	Absent	Pinnate	Semi spreading	Medium green	Large	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
53	ICCV 14510	Absent	Pinnate	Spreading	Medium green	Large	White	Medium	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
54	ICCV 14500	Absent	Pinnate	Semi erect	Medium green	medium	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
55	ICCV 14513	Absent	Pinnate	Semi spreading	Dark green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
56	ICCV 14512	Absent	Pinnate	Semi spreading	Dark green	Large	White	Short	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
57	ICCV 171301	Absent	Pinnate	Semi spreading	Medium green	Medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
58	ICCV 171305	Absent	Pinnate	Semi erect	Medium green	Medium	White	Short	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
59	ICCV 171306	Absent	Pinnate	Semi erect	Dark green	Large	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
60	ICCV 171315	Absent	Pinnate	Semi spreading	Dark green	Medium	White	Short	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
61	ICCV 171308	Absent	Pinnate	Semi spreading	Dark green	Small	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
62	ICCV 171309	Absent	Pinnate	Semi spreading	Medium green	medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
63	ICCV 171312	Absent	Pinnate	Spreading	Dark green	Large	White	Short	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
64	ICCV 171313	Absent	Pinnate	Spreading	Medium green	Medium	White	Short	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
65	ICCV 171314	Absent	Pinnate	Semi spreading	Medium green	Medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
66	ICCV 6301	Absent	Pinnate	Semi spreading	Dark green	Medium	White	Short	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
67	ICCV 06303	Absent	Pinnate	Semi spreading	Dark green	Medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
68	FLIP 09-348C	Absent	Pinnate	Semi erect	Dark green	Small	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
69	FLIP 08-986	Absent	Pinnate	Semi spreading	Dark green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
70	FLIP11-51C	Absent	Pinnate	Semi erect	Medium green	Medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
71	FLIP11-53C	Absent	Pinnate	Semi erect	Medium green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
72	FLIP11-64C	Absent	Pinnate	Semi erect	Dark green	Medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
73	FLIP11-65C	Absent	Pinnate	Semi	Dark green	Small	White	Long	Beige	Large	Owl's head	Smooth	Present

				spreading					(kabuli)		shape		
74	FLIP11-78C	Absent	Pinnate	Semi spreading	Dark green	Large	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
75	FLIP11-84C	Absent	Pinnate	Semi erect	Dark green	medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
76	FLIP11-87C	Absent	Pinnate	Semi erect	Medium green	Large	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
77	FLIP11-91C	Absent	Pinnate	Semi erect	Medium green	Large	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
78	FLIP11-93C	Absent	Pinnate	Semi erect	Medium green	medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
79	FLIP11-156C	Absent	Pinnate	Semi erect	Dark green	medium	White	Short	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
80	FLIP11-164C	Absent	Pinnate	Spreading	Medium green	Small	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
81	FLIP11-180C	Absent	Pinnate	Spreading	Dark green	Small	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
82	FLIP11-183C	Absent	Pinnate	Semi erect	Light green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
83	FLIP11-195C	Absent	Pinnate	Spreading	Medium green	Large	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
84	FLIP11-197C	Absent	Pinnate	Semi erect	Dark green	Medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
85	FLIP11-211C	Absent	Pinnate	Semi erect	Dark green	Large	White	Medium	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
86	FLIP11-220C	Absent	Pinnate	Spreading	Dark green	Small	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
87	FLIP11-232C	Absent	Pinnate	Semi erect	Dark green	Large	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
88	ILC482	Absent	Pinnate	Semi erect	Medium green	Medium	White	Medium	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Present
89	FLIP88-85C	Absent	Pinnate	Spreading	Dark green	Small	White	Medium	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent
90	FLIP93-93C	Absent	Pinnate	Spreading	Medium green	Large	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
91	JGK 32-1	Absent	Pinnate	Semi Spreading	Dark green	medium	White	Medium	Beige (kabuli)	Large	Owl's head shape	Smooth	Present
92	JGK 1	Absent	Pinnate	Semi Spreading	Light green	medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
93	JGK 2	Absent	Pinnate	Semi Spreading	Light green	small	White	Short	Beige (kabuli)	medium	Owl's head shape	Smooth	Absent
94	JGK 3	Absent	Pinnate	Semi spreading	Dark green	medium	White	Long	Beige (kabuli)	Large	Owl's head shape	Smooth	Absent
95	JGK 5	Absent	Pinnate	Semi Spreading	Dark green	Large	White	Long	Beige (kabuli)	Extra large	Owl's head shape	Smooth	Absent

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