

ASSESSMENT OF GENETIC DIVERSITY BY MORPHOLOGICAL CHARACTERISTICS OF BLACK PEPPER CULTIVARS (*Piper nigrum* L.) COMMONLY GROWN IN SOUTHERN VIETNAM

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Black pepper (*Piper nigrum* L.), a perennial climbing plant belongs to Piperaceae family which is known as the King of Spices, is the most important and widely-used spice in the world. Besides using as a spice, two high-value products isolated from peppercorn: piperine and essential oil are used for the processing of perfume and flavouring. One of the biggest challenges the development of pepper production in Viet Nam facing is the improvement of existing cultivars. The determination and assessment of genetic diversity of commonly-grown cultivars are the fundamentals of pepper cultivar improvement, a crucial requirement of pepper production.

Twenty commonly-grown black pepper varieties (7 cultivars in the South Eastern region, 10 cultivars in the highland and 3 cultivars in the South Central coastal region) were assessed based-on 29 morphological characteristics introduced by IPGRI (1995). The pedigree tree was built based-on the Euclidean distance coefficient to group black pepper cultivars with UPGMA (Unweighted Pair Group Method with Arithmetic Mean).

The correlation among black pepper cultivars based on morphological traits by analysis of the hierarchic group indicated that groups of black pepper cultivar are so different at the unlike location of the Euclidean distance coefficient on the pedigree tree. At the Euclidean distance coefficient with 8.17 from pedigree tree, 20 black pepper cultivars were divided into three main groups: group I consisted of 14 black pepper cultivars (VL1, VL2, VL3, VL4, VL5, VL6, Se1, Se2, Se3, Se4, Se5, Se6, AD4, and AD5); group II included three Trau black pepper cultivars (Tr1, Tr2 và Tr3) and three Ando black pepper cultivars (AD1, AD2 và AD3) belonged to group III. (Figure 1).

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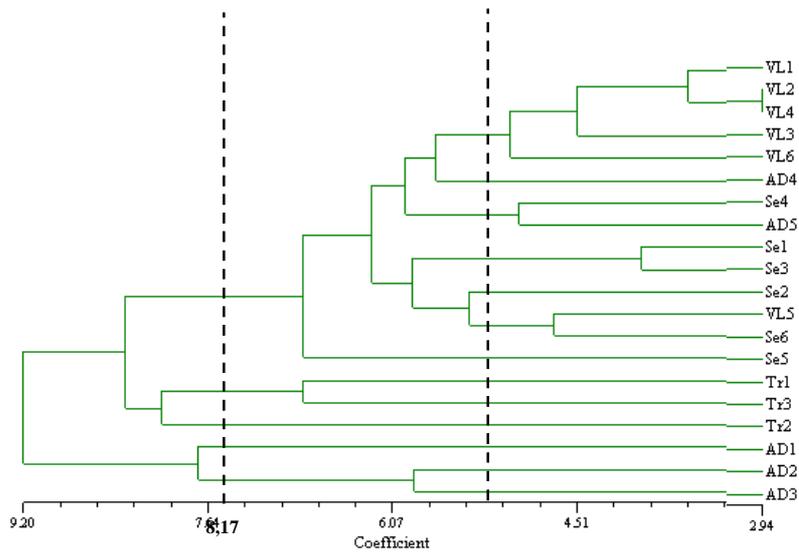


Figure 1. Pedigree tree of 20 black pepper cultivars commonly grown in Southern Vietnam

At the Euclidean distance coefficient 6.07 from pedigree tree, the black pepper cultivars in the main group I were divided into three subgroups: subgroup IA consisted of eight black pepper cultivars (VL1, VL2, VL3, VL4, VL6, Se4, AD4, AD5); subgroup IB include five black pepper cultivars (Se1, Se2, Se3, Se6, VL5); and subgroup IC had only one black pepper cultivars (Se5).

The main group I where black pepper cultivars VL3, VL5, Se4 and AD4 having peppercorn dry yield of over 5.0 kg per vine and the volume of dry peppercorn gained fairly high. Black pepper cultivar Tr2 in group II had good characteristics such as high yielding (reached 8.0 kg of dry peppercorn per vine) and a stable yield during many years. The volume of dry peppercorn was over 600 gram per litter. These cultivars had promised and preeminented characteristis so that they need to be considered and studied in the future.

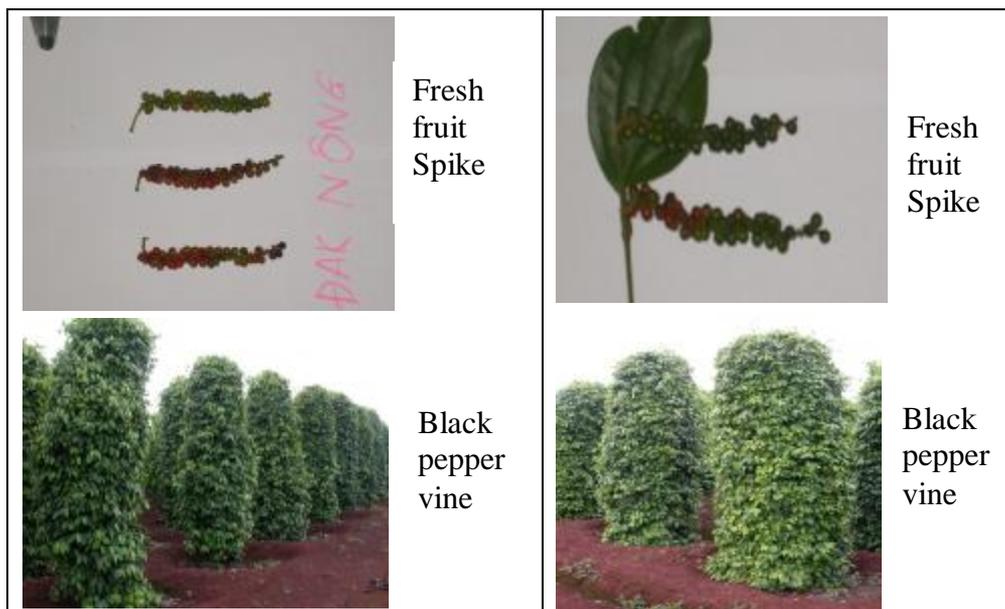


Photo 1. Black pepper cultivar VL3

Photo 2. Black pepper cultivar VL5



Photo 3. Black pepper cultivar Se4

Photo 4. Black pepper cultivar AD4

The diagram of the population allocation of black pepper cultivars on three main variable trends demonstrated the diversity of studied black pepper cultivars. The 'Trau' black pepper cultivars (Tr1, Tr2, Tr3) got together in one group while Ando cultivars (AD1, AD2, AD3) joined together into another group. The remain cultivars reunited into another group (Figure 2).

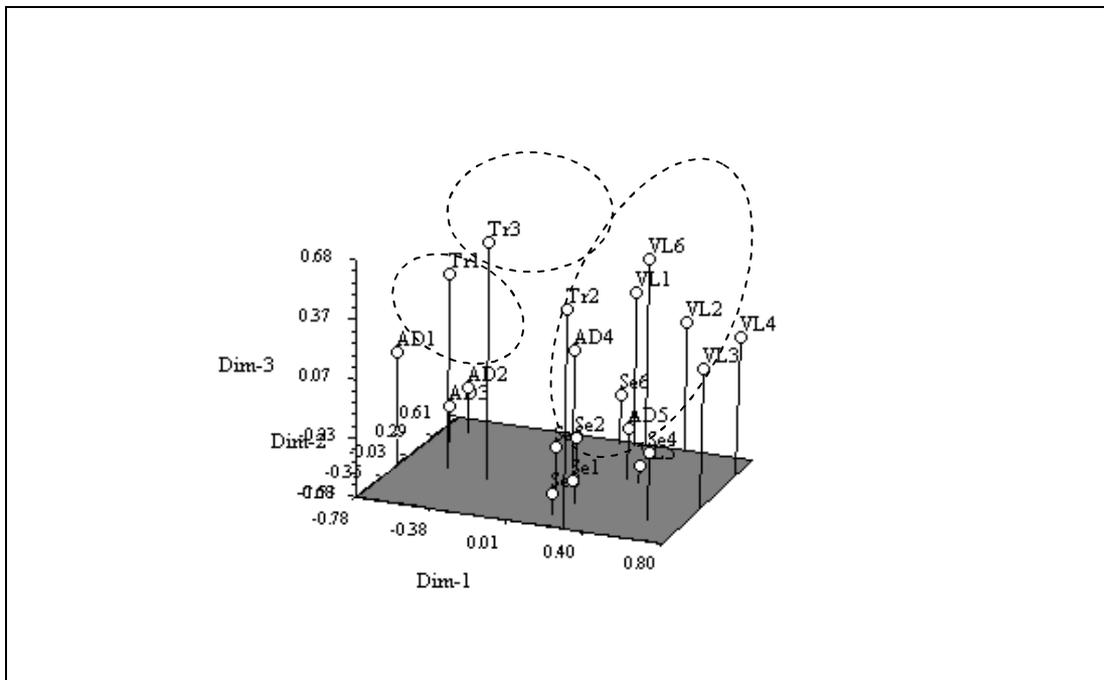


Figure 2. The population allocation of black pepper cultivars on three main variable trends

- Twenty black pepper cultivars which are commonly grown in provinces of southern Vietnam present very high diversity based on the analysis of morphological characteristics (quality and quantity traits).
- At the Euclidean distance coefficient 8.17 from pedigree tree, 20 black pepper cultivars are divided into three main groups. Group I has 14 black pepper cultivars consisting of Vinh Linh 1, Vinh Linh 2, Vinh Linh 3, Vinh Linh 4, Vinh Linh 5, Vinh Linh 6, Se 1, Se 2, Se 3, Se 4, Se 5, Se 6, Ando 4 and Ando 5. Group II includes three cultivars (Trau 1, Trau 2, and Trau 3). Three cultivars: Ando 1, Ando 2, and Ando 3 belong to group III. Vinh Linh 3, Vinh Linh 5, Se 4, Ando 4 in group I and Trau 2 in group II had very high yield and good peppercorn quality.