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Certainly! Here's a **concise summary** of the research study on "Studies on Correlation, Heterosis and Combining Ability for Yield and Quality Traits in Basmati Rice (*Oryza sativa* L.)":

Objective:

To evaluate genetic variability, heritability, combining ability, and heterosis among eight lines and three testers of basmati rice for yield and quality traits under a line × tester mating design.

Material & Method:

- 8 lines and 3 testers were crossed to produce 24 F1 hybrids.
- Trials were conducted at Pantnagar during Kharif 2016-17 and 2017-18.
- Traits analyzed: days to 50% flowering, plant height, panicle length, number of grains and tillers per panicle/plant, grain yield per plant, 1000 grain weight, hulling/milling/head rice recovery, grain length/breadth ratio, alkali digestion value, gel consistency, amylose content, and kernel elongation.

Key Findings:

Genetic Variability & Correlation:

- Significant genetic variation was observed for all traits.
- Grain yield positively correlated with number of effective tillers and 1000 grain weight.
- Grain length positively correlated with gel consistency and amylose content; length/breadth ratio negatively correlated with gel consistency.
- Alkali digestion negatively correlated with gel consistency.

Combining Ability:

- Specific Combining Ability (SCA) variance exceeded General Combining Ability (GCA) variance, indicating predominance of non-additive gene action.
- Overdominance gene action was observed for most traits.
- **Pant Basmati 2** and **UPR3709-8-1-2** emerged as good general combiners for yield and several quality traits.
- **Pant Sugandh Dhan 25** and **Pant Sugandh Dhan 27** were the best testers in general combining ability.

Promising Crosses:

- **Pant Basmati 1 × Pant Sugandh Dhan 25** showed significant positive specific combining ability effects for grain yield and quality.
- **UPR3801-3-2-1 × Pant Sugandh Dhan 25** was best specific combiner for yield and 1000 grain weight.
- Crosses such as **UPR3801-3-2-1 × Pant Sugandh Dhan 27** and **Basmati 370 × UPR3506-7-1-1** showed early flowering and reduced plant height.

Heterosis:

- Significant heterosis observed for most traits over mid-parent, better parent, and standard checks.
- Negative heterosis for days to 50% flowering and plant height was considered desirable, indicating earliness and dwarfness.
- High positive heterosis for grain yield, 1000 grain weight, and quality parameters identified valuable hybrids for breeding programs.

Heritability & Genetic Advance:

- High heritability for most traits except grain yield, panicle length, and days to 50% flowering.
- Highest genetic advance noted for gel consistency, plant height, and flowering days.

Conclusion:

- Non-additive gene action predominates inheritance of yield and quality traits.
- Exploiting heterosis and specific combining ability is recommended for breeding high-yielding, quality basmati rice hybrids.
- Selection for positively correlated traits with high heritability, such as flowering days, plant height, panicle length, grain yield, and gel consistency, is crucial.
- Parents and crosses identified (e.g., Pant Basmati 2, UPR3709-8-1-2; various crosses involving Pant Sugandh Dhan lines) can be utilized effectively in breeding programs for improved yield and quality.

If you require, I can also provide a brief **highlight** of key promising parental lines and hybrids for various traits as identified in the study. Just let me know!

