Leaf Sampling Guide for Grapevines

Tissue analysis is an effective and reliable tool to know the nutrient status of grapevine especially when vines reach the bearing age. Tissue analysis is used as diagnostic tool for detecting hidden hunger and nutrient deficiencies of plant before the deficiency symptoms become visible. In grapevines, petioles are most sensitive to the changes in nutritional status and their nutrient composition helps in taking correct decisions for nutrient management.

Grape petioles are sampled twice under double pruning and single cropping season for regular monitoring for nutrient status of vines during the bud differentiation and full bloom stages and once during full bloom stage in single pruning and single cropping system. Petioles are the slender stems that attach the leaf blade to the shoot.

Grapevine tissue samples like leaf blade and rachis etc. are also used apart from petioles to diagnose visible grapevine disorders/ deficiencies. For this purpose diagnostic samples may be collected any time of the year.

How to sample the vineyards?

- Survey the vineyard before sampling to know the variability in terms of variety, vine growth and soil type etc.
- Samples should be representative of the vines that have been raised on the same soil type, with similar cultural practices (i.e. training system, fertilizer, irrigation, hormone application and vigor control practices etc.) are of the same age, from same variety and raised on the same rootstock.
- Petiole should be collected from the representative vines in the vineyard to ensure that the entire vineyard unit is represented.
- Select only the leaves from healthy shoots that are well exposed to sunlight.
- Do not collect leaves infected with diseases, showing moisture stress, having physical/chemical injury or damaged by insect pests.
- Sampling the same vines at the same time of day (preferably in the morning, before 11 am) consistently every time will improve the consistency of the results for comparing the grapevine's nutrient status and adjusting fertilizer doses over the years.
- Do not select vines on the border of the vineyard block or near dusty roads.
- Do not select the vineyards which have received nutrient sprays.
- Avoid contact with metal surfaces and tools during the sampling process.

Sampling for routine monitoring of nutritional status of vines:

Bud differentiation stage (BDS): Petioles should be collected from recently mature leaf which is generally 5th leaf from the base during this stage i.e. approximately 40-45 days after foundation pruning (Fig.1).

Figure1. Petiole/leaf position during BDS

Full Bloom Stage (FS): Petioles should be collected from the leaf opposite the first cluster or bunch from the bottom of the shoot during this stage when approximately 70% (two thirds) of the flower caps have dropped (Fig. 2). Sampling during this time ensures that the tissue will be at the same

Figure2. Petiole/leaf position during Full bloom stage

physiological stage regardless of region and seasonal differences.

Collect a total of 100-200 petioles depending on the variety since some varieties have small sized petioles. On an average, collect one to two petioles per vine for routine analysis.

Diagnosing visual disorders/ deficiencies/ toxicities

- Collect 100 - 200 petioles from symptomatic leaves regardless of their shoot position on vine. Simultaneously, collect an equal number of petioles from the same shoot position on non-symptomatic or healthy vines (Fig.3a) and label them as independent samples for analysis.
- If the healthy and symptomatic leaves are present on the same vine then the samples from both healthy and symptomatic shoots should also be

collected from the same shoot position separately (Fig.3b).

- For diagnosis of certain toxicities like sodium, boron and chloride follow the same procedure to collect the leaf blade samples and send to the laboratory.
- For diagnosis of certain disorders rachis tissue may also be needed. Collect the rachises from the

Figure 3 a & b. Collect separate samples from healthy and affected vines/ vine parts for

healthy and symptomatic bunches in the same way as mentioned for petiole/blade tissues.

Handling of the samples: Remove the blade immediately after the leaf has been detached from the shoot. Place each sample in a well-labeled, clean paper bag and deliver to the laboratory as soon as possible. If there is a delay, keep the sampled petiole in plastic bags and store in a refrigerator after wrapping in clean paper towel. Write the sample information details (name of the grower/ vineyard with complete address, variety, growth stage etc.) on a paper sheet and send along with samples to laboratory.

In case it takes more than two to three days for the sample to reach the laboratory, it is recommended to clean and dry the sample at your end. The procedure is very simple. Wash the sample in water containing a small amount of detergent (0.2%) having neutral pH (e.g. Teepol) followed by washing in N/10HCl and then followed by three distilled water rinses in a sequence. Some nutrients/ elements like potassium (K), Na, and Cl are easily leached from necrotic or dead tissue during the course of washing. Therefore, sample washing should be completed quickly (in less than a minute) and excess water should be removed from the tissues. Leaf blades, in particular, should be dried quickly to avoid mold formation. A forced-air or well-ventilated oven at 70 to 80°C is ideal for sample drying. Certain nutrients which are in the questionable range at bloom should be tested later in the season to determine if deficiency has developed. This is particularly useful with K which declines in the vegetative parts and can become deficient during fruit ripening.

Prepared by:

Dr. Jagdev Sharma and Dr. A. K. Upadhyay
NRC for Grapes, Pune-412 307

Published by:

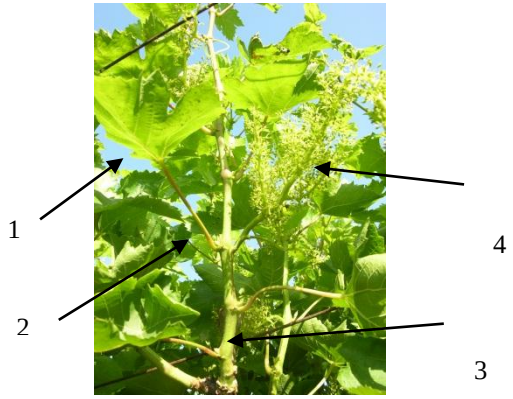
Dr. P. G. Adsule, Director
NRC for Grapes, Pune

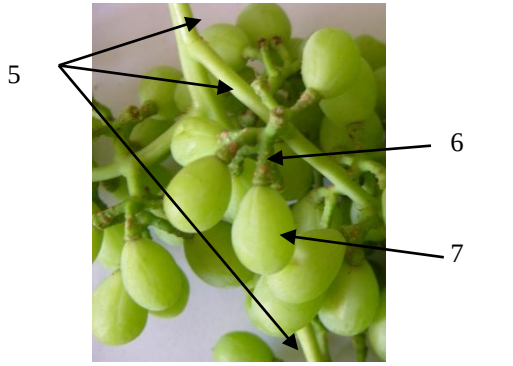
June, 2012

Phone: 020-26950000/1/2

Email: dirnrcg@gmail.com
Website: http://nrcgrapes.nic.in

Leaf Sampling Guide for Grapevines





1. Petiole 2. Blade 3. Internode 4. Cluster/ bunch
5. Rachis/ bunch stem 6. Pedicel 7. Berry

राष्ट्रीय अंगूर अनुसंधान केन्द्र
(भारतीय कृषि अनुसंधान परिषद)
डाक पेटी नं. 3, मांजरी फार्म डाकघर, सोलापूर रोड,
पुणे – 412307, भारत

NATIONAL RESEARCH CENTRE FOR GRAPES
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
P.B. NO. 3, MANJRI FARM POST, SOLAPUR ROAD,
PUNE - 412 307, INDIA